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in relation to the dairy industry
EIGHTH ANNUAL REPORT

16657
OF THE

NEW YORK

STATE DAIRY COMMISSIONER,

FOR THE YEAR 1891.

TRANSMITTED TO THE LEGISLATURE JANUARY 5, 1892.

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IN ASSEMBLY,

JANUARY 5, 1892.

EIGHTH ANNUAL REPORT

OF THE

NEW YORK STATE DAIRY COMMISSIONER.

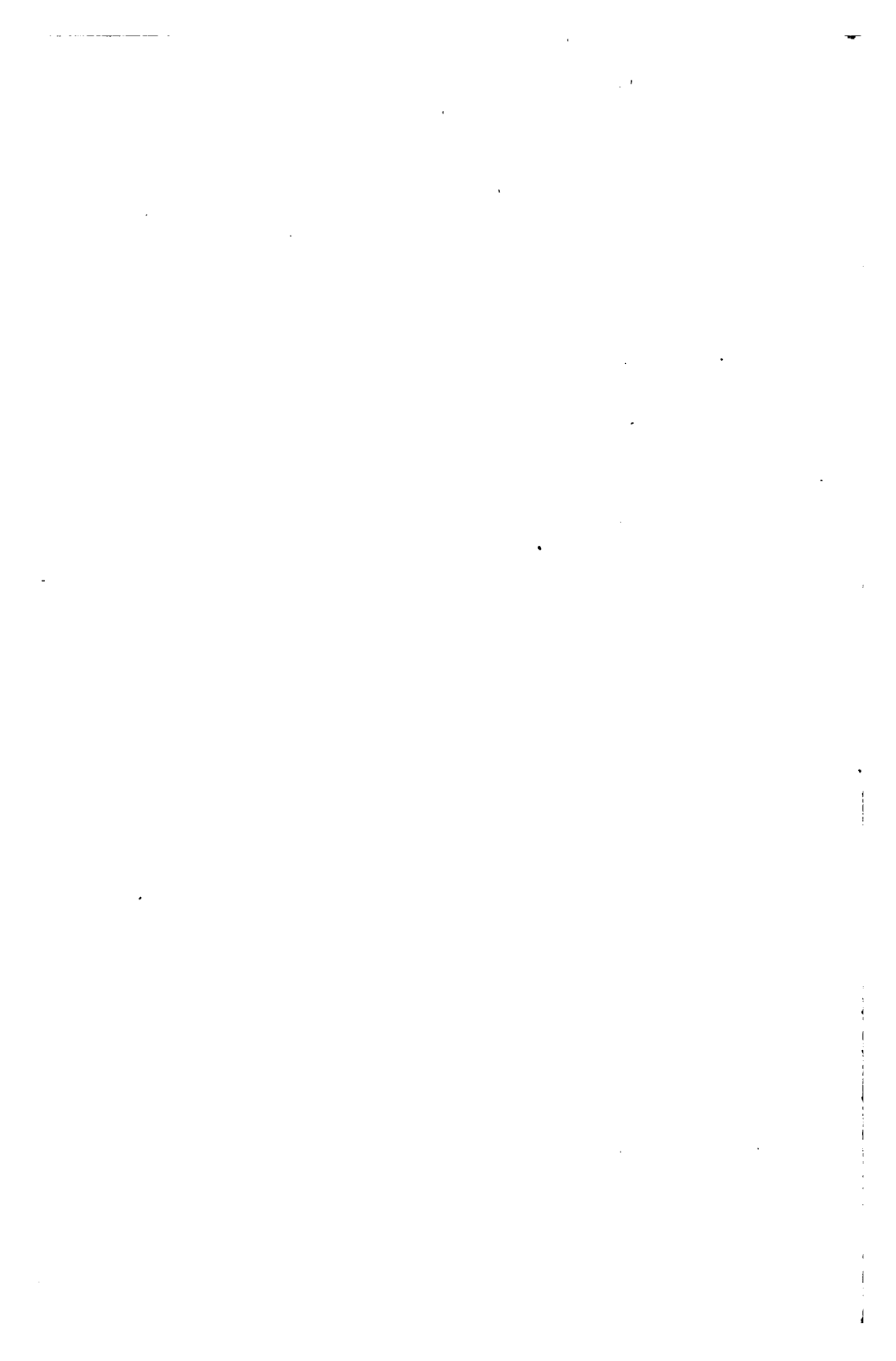
To the Honorable the Legislature of the State of New York:

In accordance with the provisions of the statutes, applicable thereto, I hereby submit the report of the work performed by the New York State Dairy Commission for the year ended September 30, 1891.

JOSIAH K. BROWN,

New York State Dairy Commissioner.

Rec'd 11.33.11.9



R E P O R T .

To the Honorable the Legislature of the State of New York :

I hereby submit this the eighth annual report of the work performed by the New York State Dairy Commission, for the year ended September 30, 1891.

For the purpose of systemizing the work and making the department effective in whatever it has to do the State has been divided into ten divisions, the work in each being either under the charge of the dairy commissioner, or an assistant commissioner who is held responsible for the work performed therein. The divisions are as follows:

First division.—Comprising the following counties: Albany, Montgomery, Otsego, Rensselaer, Schenectady, Schoharie.

Second division.—Comprising the following counties: Kings, New York, Queens, Richmond, Suffolk and one-half of Westchester.

Third division.—Comprising the following counties: Columbia, Delaware, Dutchess, Greene, Orange, Putnam, Rockland, Sullivan, Ulster and one-half of Westchester.

Fourth division.—Comprising the following counties: Chemung, Genesee, Livingston, Schuyler, Steuben, Wyoming.

Fifth division.—Comprising the following counties: Herkimer, Jefferson, Lewis, Oneida, Oswego, St. Lawrence.

Sixth division.—Comprising the following counties: Clinton, Essex, Franklin, Fulton, Hamilton, Saratoga, Warren, Washington.

Seventh division.—Comprising the following counties: Broome, Chenango, Cortland, Madison, Onondaga, Tioga, Tompkins.

Eighth division.—Comprising the following counties: Cayuga, Monroe, Ontario, Seneca, Wayne, Yates.

Ninth division.—Comprising the following counties: Orleans, Erie, Niagara.

Tenth division.—Comprising the following counties: Alleghany, Cattaraugus, Chautauqua.

I thought possibly that with the State thus divided we might, with the money at our command, practically cover it so as to put an assistant commissioner within easy reach of the people of every locality and afford them thereby ample protection.

While I am convinced that thus dividing the State has facilitated the work and brought the department closer to the people, I am also convinced that some of the divisions are too large to permit of the effectiveness anticipated.

The work of these assistant commissioners is almost wholly executive. It is to see that the statutes are enforced which provide against: First, manufacturing, keeping for sale, or offering for sale any oleaginous substance not made from pure milk or cream of the same, which shall be in imitation of butter or cheese the product of the dairy; second, which provide against selling, or exposing for sale, any milk that is unwholesome, impure, or adulterated; third, which provide against the manufacture, sale, or keeping for sale, vinegar below a certain standard or vinegar in imitation or semblance of cider vinegar, which is not cider vinegar; or selling or keeping for sale, as and for cider vinegar, any vinegar which is not cider vinegar; and the manufacturing, producing, selling, or keeping for sale any vinegar in which is used any preparation of lead, copper, sulphuric acid, or other ingredients injurious to health, or any artificial coloring matter. In addition to this work, there is employed by this department, under the provisions of chapter 298 of the Laws of 1888, expert butter and cheese makers, whose duty it is to inspect butter and cheese factories and the methods employed therein, and attend such agricultural fairs, institutes, meetings and conventions, within this State, as shall be designated by the commissioner, to impart thereat information as to the best and most approved method of making butter and cheese and improving the quality thereof.

There are employed in this work at present three men who have had experience of about twenty years each in the manufacture of cheese. The special reports of the assistant commission-

ers of the work performed in their respective divisions during the last fiscal year, and the reports of each of the men employed as instructors are attached hereto as a part of the appendix of this report.

In my last annual report to your honorable body, I stated that the manufacturers and dealers in oleomargarine and kindred products, who had shown great zeal and enterprise in pushing the sale of their goods, had practically abandoned New York State as a profitable place to pursue their business and the sale of such goods had ceased to be a factor in the business enterprises of this State.

I stated at that time that just what they might do if the agents of this department were not keenly alive to the possibilities was not known, but the fact that their agents endeavored quietly and clandestinely to place their goods in the boarding-houses and restaurants was indicative of what might follow if the vigilance was relaxed.

The traffic in these goods in the State stands to-day practically as it did at that time. The whole matter may be briefly stated by saying that it seems to be a struggle on the part of those selling the goods to profitably place them in the restaurants and other places of public entertainment within the State. Our work is, therefore, essentially detective as to this product, it being our aim to find every such place as soon as possible and stop their use therein.

We have kept as close a surveillance upon the movements of persons who are trying to place these products as the money at our command would permit. The plan adopted was to watch for the goods as they entered the State and follow them to their destination, if they were being used in violation of the statutes to prosecute the offenders. This method recommends itself to us for the two-fold reason that we can thus keep the goods in sight, and, second, because it is cheaper than any other method known; but we do not confine ourselves entirely to this for fear that some of the packages brought in may escape us; for that reason we, from time to time, make a personal inspection of

different places of public entertainment to see that the statutes are not violated with impunity. We also keep up an inspection of all places where butter is kept on sale, the necessity for which is demonstrated by the occasional finding of the imitation goods.

Attempts to deal in these articles openly and above board as merchantable commodities have been abandoned except in one phase; it is still claimed by certain manufacturers that they have a right to introduce and sell within the State in the original package. Under this guise efforts are being made to handle the goods in such way that they may reach these places of public entertainment legitimately notwithstanding that their use on the tables therein is a violation of the law.

Providing the ground thus taken is correct it can be of but little benefit to those desiring to take advantage of it as it allows the traffic to go but one step beyond the border line of the State, and although that step may place the goods directly in the hands of the person who is to place them before the consumer, the placing before the consumer is a violation of the law, if no previous step has been, and it is right here that the dairy commissioner can at least interfere to the detriment to the profits of the business.

Your honorable body provided, during the last session, by chapter 140 of the Laws of 1891, against the use of these goods in such places, and the provisions were in terms so strong and plain as to admit of no doubt as to their meaning. The statute referred to makes it a misdemeanor if any keeper or proprietor of any bakery, hotel, tavern, boarding-house, restaurant, saloon, lunch-counter, or place of public entertainment, or any place where any person or persons in the employment of the keeper or proprietor thereof is furnished with board either without charge or as compensation wholly, or in part, for his services, or any person having charge thereof or employed thereat, shall keep, use or serve therein, either as food for their guests, boarders, patrons or customers, or for cooking purposes, any of the articles made in violation of the provisions of the statute.

An attempt has been made to get the question before the courts of this State, but thus far no case has arisen which we deem a proper one to test the question fairly in the interests of the people, so that the main portion of our work with reference to this commodity has been to stop its use in places of public entertainment, where it usually gets, if it gets anywhere, by being brought directly from outside the State, in so-called original packages.

The people of this State are to be congratulated upon the fact that, while more oleomargarine has been manufactured in the United States during the past year than during any previous year since 1887, there has been practically so little of it consumed in the State of New York that it has in no way affected the consumption of honest products, and has done but little injury, comparatively speaking. It may be stated, practically, that it has not been used in this State, the estimate being that the amount consumed will not bear a greater ratio to the quantity of the butter consumed than one-tenth of one per cent.

It is believed, however, that this commodity should be closely watched, as it is one with which the public can be easily deceived, and in which there is a great profit to the producer and dealer; for this reason the temptation to handle it is great, and if the chances of detection and punishment are reduced it is by no means certain that the percentage above stated would continue to be the measure of the consumption within the State.

The argument has been advanced and seems, even now, to be held by some that the dealers should be allowed to handle these goods, provided they sell them for what they are. The answer to this is that the statutes of the State provide that they cannot be sold on the market if they are in imitation or semblance of butter or cheese the product of the dairy. The statutes have been enforced and the sale of the goods has practically stopped. It is submitted that this fact tends to show that the people do not want and will not purchase them if they know what they are. It has been stated by me in prior reports that the only way the goods could be sold was by making them look and taste

like butter, and by selling them as and for butter. It seems that the present conditon corroborates that statement which is in harmony with and was based upon the statements and experience of butter dealers.

The above statement is made in its entirety with reference to those who purchase for their own consumption. Another evidence that points strongly to the conclusion that people will not eat them if they know what they are, and that they must be in imitation or semblance of dairy butter in order to guarantee consumption at all, is the fact that the efforts on the part of the manufacturers are confined in this State to placing them in establishments where the party purchasing the goods procures them to be consumed by others, these others, of course, eating the product believing it to be butter.

The headway they have been able to make in this State can hardly be a source of encouragement to them. The interpretations put upon the law of this State by the court of last resort has put it beyond their power to sell the goods in the form in which they manufacture them, providing there is sufficient force behind the law.

In the *People v. Arensberg*, the Court of Appeals said: "We are of the opinion that such artificial coloring of oleomargarine for the mere purpose of making it resemble dairy butter comes within the statutory prohibition against imitation, and that such prohibition is within the power of the Legislature, and that to warrant conviction it is not necessary that the article sold was calculated to deceive the person who bought it in this instance. It is enough that it was in semblance or imitation of butter and calculated to deceive any one who might buy it."

This case has laid the rule down squarely that any oleaginous substance made in imitation or semblance of butter so that it is well calculated to deceive the public cannot be sold within this State under the State laws.

No case involving the oleo question has been before the Court of Appeals since the decision in the above case, touching the question of the right to sell these goods within the State.

Milk.

The magnitude of work required of this department is apparent when it is known that it is our duty to see that the milk, produced in the entire State and sold or delivered to the manufacturers and consumers, is in a pure, healthful and wholesome condition.

The milk is produced by over 1,500,000 cows. This product reaches nearly every family in the State and in passing from the place of production to the consumer's table, goes through the hands of numerous middlemen. A great majority of the people of the State are not producers of this commodity, while all are consumers, so that the industry of producing which is confined to a given portion of the people is pretty nearly steady.

There are in the State thirty-two cities with populations varying from 10,000 to 1,500,000. Nearly all the people in these cities and nearly all those residing in the villages of the State have to depend for their supply of milk upon the dealers in this commodity. It is well known that milk not only enters largely into the food of the adult but that many thousands of infants are dependent upon it entirely for sustenance. The adulteration of milk had become so notorious in our larger cities and villages prior to the establishment of the dairy commission that it may be safely said that pure milk was the exception rather than the rule. One of the best proofs of this statement that I know of, is the fact that prior to the enforcement of the dairy laws, in one of the largest cities of the State, having a population of 133,000, the supply of milk consumed was produced within a radius of thirty miles of the city, but soon after the work of this commission commenced there, this radius became larger and larger, until now the milk consumed in that city is produced in the larger radius of 100 miles. Now, taking this as an illustration of the equitable results, it seems to me that two good conclusions can be drawn, namely, first, that the enforcement of this law has given the consumer that which he is entitled to, an honest product just as produced by the cow. This, of course, is fraught with more good to the people of the State than would come to them from simply

doing away with the fraud, for it has, at the same time, done away with a condition of things that was inimicable to the life and health of thousands of infants; it can hardly be contended that the enforcement of a law which is in every way in the interest of the younger part of our population and to the detriment of no one, who is honest, is a bad thing for the community in general. Another good result of the enforcement of this law from a commercial and industrial standpoint is that it has extended the business of milk producing over a greater territory and gives employment to and helps sustain a greater portion of our population, and that to with no detriment to any one save those who practice that which good men condemn.

The adulteration of milk sold for consumption upon the market had at one time reached a stage which was quite alarming.

It has been too well established to be doubted that adulterations had been carried on to the extent that the milk was not only watered but was also frequently skimmed and then colored to again look like milk and not infrequently chemicals were added to this liquid to keep it from spoiling. For a time after the formation of this department it was not infrequent to receive complaints concerning milk because after standing a few hours, cream had risen on it; the complaint was made because they believed the cream to be the result of some ingredient which had been added to the milk. Parties who have made complaints to this office in speaking of this milk have said "a scum has arisen on the top of the milk." Complaints of this kind, however, have not been made recently. It is a fair conclusion to draw, it seems to me, that the former experience of these people with milk, if such it may be called, had been with that grade which did not produce cream.

There are in this State in the neighborhood of 2,000 manufacturing factories to which milk is taken daily, during certain portions of the year, to be manufactured into different commodities possible to be made from milk. In some of these establishments the milk is bought and paid for by the hundred pounds; in others the milk is delivered by the patron to be manufactured and the profits

divided among the patrons in proportion to the quantity of milk delivered by them as credited upon the books of the institution.

This last plan is called the co-operative plan; the amount of money that each patron will draw depending upon the amount of milk he delivers. Here we see the temptation of the milk producer to use every legitimate effort to make the amount of milk delivered by him as great as possible. It is, however, a matter of regret as well as of fact that the effort does not stop at this point with some; complaints at this office are quite numerous that it is believed that persons are delivering impure milk at some of these factories; we have detected and punished a sufficient number to demonstrate that this thing exists to quite an extent among patrons of factories.

The fraud in this instance is by the dishonest patron and the man who suffers is the man who delivers pure milk. This has in times past been carried to such an extent by some patrons of factories that it has been seized upon by others as an excuse to do the same thing on the ground that it was a necessary offset.

In the meantime the maker is obliged to receive all kinds of milk, or rather of milk and water, to manufacture. If possible, into good butter or cheese, and if his produce is not good he is criticised and the consuming public is to suffer the consequences. At the manufactories where the milk is purchased the same condition of things prevails, while in a few cases to which our attention has been called another method of adulteration is adopted, namely: In factories using separators, with which to take the cream from the milk while it is yet sweet, the milk is given out to the patrons. We have found in a number of instances where a goodly portion of this sweet skimmed milk taken home on a given day has been returned to the factory on a following day mixed with the pure milk.

A portion of the work of this department, therefore, is to see that the delivery of the milk to these factories is not in violation of the law; this requires a close surveillance over the milk so delivered. These factories on an average will have at least twenty-five patrons each, we have known them to have as high

as eighty-five to ninety, but at the moderate estimate of twenty-five patrons to the factory this would give for the 2,000 factories 50,000 producers in the State of New York for this department to look after.

In addition to this work the milk shipped to the different cities of the State and distributed there to the consumers has to be watched carefully from the time it leaves the producer until it reaches the consumer, often involving three inspections. The milk going into New York city alone each day, transported over twelve different lines, is estimated to average 18,738 cans, representing the product of 2,973 dairies.

It is estimated that the milk consumed in this city alone during the last fiscal year is 253,000,000 quarts to say nothing about condensed milk and cream; nearly 5,000,000 quarts of cream were used, and 69,989 cans of condensed milk. This is but one city and, although the largest, what has to be done here has also to be done in each of the others requiring work proportionate to the quantity of milk consumed.

In the seventh annual report to your honorable body, I mentioned a new form of adulteration of milk; it consisted in adding a compound known as preservaline or rex magnus composed of substances which were pronounced by our chemists unwholesome; we, therefore, put forth our efforts to prevent its use and have continued our efforts in that direction during the past year and can say that it is not being used to any extent.

Another matter of considerable importance has arisen, namely, the affection of cattle with a disease known as tuberculosis.

We have received complaints with reference to milk being sold for human consumption from cattle said to be affected with this disease; we caused an examination to be made, a report of which will be found in the report of Dr. R. D. Clark, which is attached hereto as a part of the appendix.

This disease has been found to exist to quite an extent among the dairy cows; men of eminence who have devoted a large portion of their time to such questions, and are eminently qualified to give an opinion, state that it is not only contagious but communicable from the bovine race to the human family.

In view of this fact, wherever we have found milk being offered for sale for human consumption that has been drawn from tuberculous cows, we have forbidden its sale. Of course, our work in this direction has been limited in comparison to the amount to be done; for it will be readily seen, in view of our law, if we were to fully meet its language, that this subject opens up a very large field, requiring a vast amount of labor and expense; that, to decide the questions which are necessarily involved in determining whether the milk is from cows "kept in an unhealthy condition" or suffering from tuberculosis, or whether it contains bacilli, or whether it is "unhealthful or unwholesome," will necessitate repeated physical examination of all the cows whose milk is sold for consumption in this State, and require a degree of skill which is possessed only by professional men, which, of course, would be expensive. This might to an extent be obviated, if when the cows are suffering, or are suspected to be suffering, from this disease, they could immediately be quarantined, or, if found desirable or necessary, destroyed, thus putting it beyond the possibility of their product or flesh being consumed by human beings. This disease is more dangerous to the human race than pleuro-pneumonia, from the fact that in the latter the cows cease to give milk as soon as attacked, while in the former they continue to give milk, sometimes thrive and put on flesh, for a long period of time, while the milk, which may appear good, is freighted with danger to any who may consume it. It is respectfully submitted that questions may, and probably will, be presented in dealing with this milk which should be met and handled by the proper authorities, without delay or hindrance, in order to avert an impending and dangerous condition of things.

Vinegar.

When the law, chapter 515 of the Laws of 1889, was passed its enforcement was made a charge upon this department.

We placed as many agents at work to investigate the wholesale and retail dealers as the limited appropriation would permit.

We soon discovered that the greatest frauds perpetrated in the sale of this commodity was in the product known as white wine

vinegar, being colored in imitation of, and sold for, cider vinegar; there were a few instances where cider vinegar itself was being sold below the standard. We found that the artificial vinegar was being sold for the genuine to a very large extent.

However, after equipping our agents and preparing them for the best practical service, we found that we had small means with which to combat a great evil. We endeavored to so expend the money at our command as to do the greatest possible good and yet have it cover the period for which it was appropriated; of this fact I informed your honorable body in my last annual report.

During the last session of the Legislature, in making the appropriation for the work of this department, you saw fit to make it in an aggregate sum, leaving it to the discretion of the commissioner how to expend it. This method of appropriating I believe to be good, and it has produced good results in this department by enabling me to do more work in each of the branches than I otherwise could have done if the appropriation had been scattered in amounts or had been made in separate items for specific work.

At the beginning of the last fiscal year when the appropriation made as above stated became available our agents were equipped so that they could examine, at any place they might be, any one of the given commodities coming under the surveillance of this department.

We have met with some difficulties during the year, one of which we anticipated, namely, the question as to the Court of Special Sessions having jurisdiction of the cases arising under this law. Among the difficulties we have met in prosecuting the cases arising under this statute is the following:

The statute provides that any one violating it shall be guilty of a misdemeanor, and shall, upon conviction, pay a fine of not less than fifty dollars nor more than \$100.

When we commenced to try these cases we were met with this condition, that our minimum fine being fifty dollars was the same as the maximum allowed to be imposed by the Court of Special Sessions.

In some instances it has been held by the magistrate that he had jurisdiction and could try the case and impose the minimum fine; in other instances he has held that the minimum fine being the same as the maximum which the code allowed that court to impose, it took it out of his jurisdiction so far as the trial was concerned. This ground taken by the courts placed us in the position of having once made a case and gone before a magistrate to lay our information, and if the evidence was deemed sufficient the defendant would be held for the grand jury. If we secured the indictment then we again tried it in the Court of General Sessions or the Oyer and Terminer as the case might be.

This condition of things involves delay, and tends to drag a trial along for months if not years before the general determination is had.

As an illustration, in the city of Schenectady, on the 4th of March, 1891, a sample of vinegar was taken and delivered to our chemist, who analyzed it and informed us it was adulterated.

The information was laid before a magistrate on the fifth of May; we appeared before the magistrate and the case was adjourned to the fourteenth, then to the twenty-second, then to the twenty-ninth before we were able to secure an examination.

The examination occupied parts of two days, and the magistrate held the defendant for the grand jury on the ground that he had no jurisdiction to impose the fine provided for by the act.

The grand jury did not meet until September 16, 1891. Our witnesses appeared before the grand jury, gave evidence upon which the defendant was indicted and held for trial; one of our witnesses was sick and was unable to appear before that jury; while the evidence of our witnesses was sufficient to indict it was deemed unwise to go to trial without this witness. The case was put over the term and was tried at the next term of the court before Mr. Justice Tappan, on the thirteenth day of November, 1891.

The trial occupied parts of two days, and the jury, after being out from 10 a. m. until 3 p. m., reported that they were absolutely unable to agree.

Cheese.

In referring to this commodity, we cannot only confirm what we have hitherto said in reference to the needs of this great industry and what we have done to supply them, but can report material progress.

There is nothing in the line of my duty as dairy commissioner that has given me more satisfaction than the results of my efforts in advancing this great enterprise. Our expert instructors have pushed the work allotted to them to the utmost of their capacity.

The good accomplished can be no better illustrated than by stating that the demands upon them from the dairymen have been more than doubled during the past year. At the beginning of this work it was evident that there was a lack of knowledge somewhere in the process of manufacturing cheese which manifested itself in the inferior grade of much of the product, there being on the market all grades, from the poorest conceivable to a first-class cheese, and we supposed that the difficulty laid in the manufacture, but our investigations revealed to us that a large share of the trouble began back of this, even with the dairy farmer himself.

There were but few who realized the necessity of producing a good article of milk if they would have a good article of cheese. This, as is readily seen, comprehended the whole scheme of dairy farming, selection of cows, feeding, care and especially the care of the milk after it was drawn from the cow.

We found that many farmers, whose cows produced good milk, spoiled it in handling. They would lock it up tightly in the cans as soon as drawn from the cow thus retaining the impurities, for cheese making, in the form of gases and odors inherent in newly-drawn milk and very often milking or allowing it to stand in localities where it would absorb foul odors or by putting it into dirty impure cans or vehicles.

- Upon making this discovery we at once saw that the field was too extensive for our limited number of instructors to individually visit and instruct each dairy farmer in the State of New

York, so we issued a circular of instruction to milk producers and butter and cheese makers.

We distributed them at meetings of farmers and farmers' institutes, and in such other ways as would tend to place them where they would be of service.

The following is a copy of such circular:

Rules and Suggestions concerning the Care of Milk and the Making of First-class Butter and Cheese, the Observance of which is Deemed to be Essential by the Experts of this Department.

J. K. BROWN, COMMISSIONER.

RULES AND SUGGESTIONS.

I am so thoroughly impressed with the importance of the farmer becoming better educated in the care of his milk that I would feel that my duty was but poorly done if his attention was not called to certain conditions necessary to insure a good product. I am well satisfied that the future success of the cheese industry in this State depends largely upon the manner in which milk is cared for before taking it to the factory. Everything about the stable must be clean and neat, and the place where the milk can is kept must have a good, free circulation of pure air, away from the odors of the barn-yard and stable. Some device should be used by which the milk can be thoroughly exposed to the air as soon as drawn from the cow, so as to rid it of the animal odors and gases while it is warm, as they become condensed by cooling of the milk; and cannot be removed by subsequent aeration. The old time theory, that the heat in the milk is what causes all the trouble, is, I am satisfied, entirely wrong, as the heat in milk, when drawn from the cow, is no different from any other heat, and has nothing to do with the animal odors. This is easily proven by cooling a can of milk quickly, when you will find, no matter how cold it is, that the animal flavor is still there. On the other hand, take a can of warm milk just drawn from the cow, and pass it through an elevated strainer by which it is thoroughly aerated, and you will find the odor gone while the milk is yet warm. To secure the best results in cheese making

the milk should not be cooled below the temperature of the air, during the summer months, in order to secure the proper ripeness so that the acid development will keep ahead of any possible taints. The night's and morning's milk should never be mixed before arriving at the factory, as the night's milk, standing until morning, becomes loaded with the bacteria that are constantly in the air, especially in warm weather, and when you add the warm milk it raises the temperature of the whole mass, and they begin their work at once, so that by the time the milk reaches the factory it will, quite likely, be in bad condition. The idea that by hauling milk to the factory twice a day, without aerating it, removes all responsibilities from the patron, is an error. It will retain all the gas and odor, and, being covered tightly, they will become condensed in the milk where it is drawn any distance, and it will be injured before it comes under the maker's control. Too much care cannot be taken in the cleansing and scalding of utensils connected with dairy, cans, pails, strainer, etc. Remember that it must be scalding water, warm water will not accomplish the purpose. Never allow the cows to be chased by the dog. Anything that produces a feverish condition of the cow will result in injury to the milk. The farmer has so many cares besides that of giving proper attention to his milk that it is often sent to the factory in bad condition without his knowledge. He should, however, give the matter his personal attention, because the income of others, as well as his own, will be reduced by allowing his milk to go to the factory in bad condition. The food the cow eats and the water she drinks has a direct influence on the quality of her milk. The water must be pure; it is important that she be kept away from stagnant pools. They should also have plenty of salt; much discussion has been had and many experiments have been made with a view of ascertaining the amount of salt milk-cows should have. It has come to be well established that the best method of furnishing salt to cows is in some way to place it within their reach so they can help themselves every day.

In the making of cheese under the co-operative plan, as practiced

in the factories at the present time, it is necessary for the cheese-maker to be a man of excellent judgment, for, with the constantly varying conditions of atmosphere and the different ways in which the milk is cared for by the individual farmer, a small error in judgment is liable to injure the whole product. When the milk is received at the factory in the morning his sense of smell must be keen to detect the bad odors and to determine whether the milk is sufficiently ripened to have the acid development keep pace with the rennet action. This degree of ripeness is difficult to determine, as the degree of acidity must not reach the point where the milk would be turned sour. We have but one test at the present time, beside the sense of smelling, for determining the amount of acidity in the milk. It is termed the cup test. It consists in taking a small measure of milk from the vat and adding a little rennet, then noting the time which it takes for coagulation to begin. It is founded on the well-known fact that with the development of acidity in the milk the activity of the rennet is increased.

It is not easy to make this test thoroughly practical on account of the difficulty of measuring so small an amount of rennet; also of having a uniform strength at all times. Hence the importance of having the sense of smell thoroughly trained to detect the least change. There are two ways practiced at the present time for securing this ripeness when it is determined that the vat of milk is too sweet. One is by keeping over a small amount of milk that is free from taint, and souring it, and then putting it in the vat of milk at the time the rennet is added. This plan is very good if the maker is careful not to use too large a quantity and sees to it that the earthen jar, which is used for keeping the milk over, is thoroughly washed and scalded every day so as not to accumulate and carry along taints. Undoubtedly, the safer plan is to heat the milk up to a temperature of eighty-six to eighty-eight degrees and hold it there for one or two hours, or until the proper acidity is developed, and then let the temperature settle back to the setting point. This is a more natural process, and will, I think, generally give better results, although taking a little more time. In heating

the milk great care should be observed to keep it thoroughly agitated, not allowing it to rest on the bottom of the vat for any length of time; and the steam should be shut off quick enough so that the heat will not run too high when the surplus heat in the water surrounding the tin vat is thoroughly equalized through the whole mass.

The great necessity for this is that the curd shall come all alike, and not be harder on the bottom from an excess of heat. The best temperature for setting, that is, introducing the rennet, is eighty-two to eighty-four degrees in the summer and eighty-six degrees in the spring and fall. Use sufficient rennet to have coagulation begin in from eighteen to twenty minutes. The top of the milk should be kept gently agitated, to keep down the cream, but care must be exercised not to stir too long, or until the milk begins to thicken. This point can best be determined by taking a dipper of hot water and floating it in the vat of milk. When coagulation begins it will show a film on the outside of the dipper induced by the higher temperature, which causes earlier thickening. As soon as this point is reached, the vat should be covered and kept perfectly still until fit to cut. In cutting do not allow the curd to become too hard before introducing the knife. A good test for the proper time to cut is by laying the back of the fingers and hand on the curd next to the side of the vat and gently bearing it away. When it will cleave clean from the vat it is fit to cut. When the cutting is commenced finish before stopping. There is nothing to be gained by the old plan of allowing the curd to stand and settle after cutting once through, but, on the other hand, a positive loss, as the curd becomes tough, and will push before the knife, breaking off small particles, which are lost. Use every care to have the pieces of curd even, so that the heat and rennet will act together and on all alike, producing an even curd, without which it is impossible to make a fine cheese. As soon as the cutting is completed commence to stir gently and continue until the curd is healed over, which usually takes about fifteen minutes, before applying any steam. The skin or film that forms on the outside of each kernel of curd acts as a strainer, retaining the but-

ter fats, but allowing the moisture to pass out. Hence the necessity of careful handling, not to mangle the curd and waste the fats, and of slow heating, until a temperature of ninety degrees is reached, which should take at least forty minutes, so as not to shrink the film too quickly and thus destroy its porosity, thereby forming a sack of each kernel of curd, from which the moisture cannot escape, except as the piece of curd is broken, when the butter fat will pass out with it.

After reaching a temperature of ninety degrees the heat may be increased with more rapidity up to ninety-eight degrees, which is the point at which the rennet has the greatest activity and beyond which the temperature should never be raised if it can be avoided, for it tends to diminish the butter fats, as butter begins to melt at ninety-eight degrees, and when the temperature is carried beyond that point, so that the fat is melted in the curd, there cannot help but be some loss. After shutting off the steam, the curd should be kept stirred until it reaches that stage of contraction at which it will not pack, and the heat is thoroughly absorbed from the water surrounding the tin vat, and then not allowed to rest a great length of time, but stirred up at short intervals so as to have the curd all even and alike. There should always be a cover to spread over the vat during this time to retain uniformity of temperature through the whole mass. The curd should be closely watched from this time on, and until the beginning of the development of acid, which should be in from two to two and a half hours. If, at this point, there is not a sufficient separation of moisture from the curd, the whey should be drawn down, leaving just sufficient to float the curd, and then hand-stir until the curd becomes firm and has a shotty appearance. Or, when taken in the hand and squeezed for a short time, then opening the hand the curd will fall apart, assuming its original shape. It is very important at this time that there should be just the right amount of moisture separated from the curd. If too much moisture is driven out, there will be a loss in yield and a coarse hard-textured cheese. On the other hand, too much moisture makes a cheese that cures too fast and will get off flavor quickly, for the reason that the

retaining of so much moisture carries with it the conditions that are the most favorable to the development of the bacteria of putrefaction. Up to the time of drawing the whey, the plan of handling the curd will be about the same whether you make a stirred-curd, or what is termed sink cheese, or follow the Cheddar plan which has been adopted by this department. Not that good cheese cannot be made in the other way, where all the conditions are favorable, but taking into account all the changing conditions that the cheese-maker must meet, we have no doubt the Cheddar plan is the safest. When the curd reaches the condition of dryness that your experience shows to be the most favorable, and will show about one-quarter inch of fine thread by the hot-iron test, the curd should be packed on the side of the vat, leaving a space in the middle for the surplus whey to drain off. After leaving a sufficient length of time for the curd to mat together, cut it in strips and turn it over. After allowing it to drain for a short time double it up and continue to do so until you have the curd in a compact mass, then cover it up to retain the temperature, for it has been found that where the temperature is allowed to fall below ninety-two to ninety-four degrees, during this digestive process, that the activity of the rennet is impaired and too much moisture retained in the curd, which has a tendency to make a pasty, weak-bodied cheese. Whey should not be allowed to collect on the curd in pools during this time, but it should be repacked occasionally, and the outside pieces put inside so that the rennet may act on every part alike and the assimilation be perfect.

The time when the curd reaches the condition that it is ready to be ground and salted must be determined by its appearance. When it begins to feel mellow and velvety and has a stringy, fibrous texture, and a smell like fresh buttermilk, it is ready to be ground and salted. If, at this time, there should be developed a gassy or porous condition, the acid development must be carried farther, or until the gas cells become flattened before grinding. After salting, the curd should be stirred for ten or fifteen minutes before putting to press. After hooping the curd, the pressure

should be light at first gradually increasing. Cheese should be kept in the press at least eighteen hours, as they will retain their shape better. The curing-room should be so arranged that the temperature can be controlled and not allowed to go over seventy or seventy-two degrees, which is conceded to give the best results in curing the cheese. See to it that the ventilation is so arranged as to carry off all bad air, and the drainage such as to carry away the slops, not allowing them to lay around the factory to develop putrefaction.

You must not expect your patrons to take good care of their milk unless you practice what you preach.

OUR DAIRY INTERESTS.

Making butter.

It has been well said "that making good butter is an art." I realize that it is a difficult thing to make any positive rules for the processes connected with the business, and it is also almost impossible to follow definite rules, as the conditions are so varied, and the circumstances so changeable and irregular. It is, however, a positive maxim that the more closely definite rules are followed and positive principles are observed, the more uniform will be the butter and the better its quality. This being a law, it is wise then to endeavor to know all we can of the principles involved in butter-making, and to understand the reasons why poor results follow practices altogether too common. Canvas and paint are requisite for a painting, but with them there must be skill, if not genius, to so utilize them as to secure success. As in the productions of the real artist, skill must enter into the manufacture of dairy products in order to obtain the best results. With all rules, therefore, there must be careful observation and good judgment. The observation must be keen, and the judgment good and acute, so that it will not be governed on the one hand by prejudice or inherited customs, and on the other hand it will not be warped by the webs of conceit, or bound up by preconcerted fancies or notions.

When the dairyman can free himself from these shackles, he will wisely select cows for his butter dairy of herds which are specially adapted for two purposes, and he will look carefully for the families which have made profitable records direct in his line. If he does do this, he will be led to breed his cows in a way to secure the best results for butter-making. The same progressive spirit and intelligent enterprise will lead a dairyman to test his herd, be they thoroughbred or native, to find out the individual capacity of each cow for the secretion of butter fats.

A test of the cows should be made without delay in every herd. No dairyman is pursuing an intelligent course until he does this. He may find that one-third of his cows are running him in debt every day, and he is likely to find that another third are barely paying their way, leaving only one-third of his herd which really afford any profit for their keeping and the labor bestowed upon them. The test may be made, for all practical purposes, by setting the milk of one day by itself and churning it; being careful to have the conditions as near alike for each cow and each test as possible. This simple effort to get at the foundation of the dairy will often let in a flood of light and astonish the owner of the cows. It seems to me that this examination of the foundations of our business is a necessity, and still not one dairyman in a hundred has ever done it. No dairyman knows where or how he stands as a business man until he tests the individual ability of all his cows for secreting butter fats.

Feeding.—The feeding comes next for careful consideration. The cow which has shown that she has less than three per cent of butter fats in her milk, when fed the same as those which have produced four per cent, may be condemned at once as not designed for a butter cow, nor for any use except to make beef, and the sooner her destiny is fulfilled the better. If a cow, on ordinary food, shows three and a half, or better, four per cent of butter fats, with a careful test, she should be spared and be fed liberally with food calculated to make rich milk. If she responds to this feeding with more butter, she is deserving of further use in the dairy, until cows of a higher order of attain-

ment can be procured. The dairyman should not stop short of five per cent of butter fats, and get as much higher as he can. This line of improvement swells the quantity, and thus we must have much above the present average in the State to make butter-making remunerative. The feeding problem is one of commanding importance, and next to the value of the cow, and perhaps equal to it, as the good cow will be made poor in yield if not well fed. Many cows, naturally good, or possessing all the physical development required for producing plenty of milk, and milk rich in solids, cannot fill their natural mission because of a lack of food support. The excellent cow has not yet found a way to produce something from nothing. Man may, in his imagination, but the cow has no such miraculous power. She is an honest and most practical friend.

The foods which abound in starch, sugar and woody fiber, classed as carbonaceous, are not fitted alone to produce butter fats, or perhaps I should say, to produce milk rich in solids, with a large per cent of butter fats. This is especially true if there is an excess of the woody fiber in the foods. How can we expect the cow, however industrious she may be, to make rich milk out of straw, dry ripe cornstalks, poor hay and any of the foods which we know are lacking the real elements of nutrition? Thought will tell us this fact, and then we ought to know from observation that such foods make very little butter and of very poor quality. What shall we do then? Why, follow the law scientists have given us, and unite with the carbonaceous foods the richer albuminoids in the foods which contain a larger per cent of nitrogen, or the foods which make muscle—real animal substance. The farmer may say right here that butter is not muscle; very true, but butter is fat; and if the cow must get all of her heat (animal life) and lubrication out of the weak and inefficient foods, straw, dry cornstalks and the like, where is she going to get the excess of fat required for producing butter? The muscles must be fed or there will be a lack of vitality and decay will follow. With the natural draft made by the system on the food, or rather the nutrients in the foods, the cow can-

not consume enough of these coarse foods to have much, if any surplus for the pail. Again, if she is fed the carbonaceous foods in a more concentrated form, they do not meet her entire physical requirements, and her nature demands the combining of both the muscle and the heat and fat forming foods. By this combination she will eat more of both and digest more and produce more milk and more solids. This she does when she has fresh grass to eat, and in our attempts to feed the cow we should try to give her balanced proportion of foods, as the cow gets them in a good pasture. This will insure butter of a uniform texture and balance in its elements. We can, therefore, never go amiss in giving our cows wheat, corn, oats, linseed and cotton-seed meal, peal meal and other nitrogenous foods with the hay, corn-fodder, ensilage and straw.

The care of the milk.—This is the next natural consideration. It should be drawn from the cows as rapidly as possible to insure a good flow. The cow should be kept as quiet as possible during the milking, hence I recommend milking in the stable. The milk should not be left standing in any stable, and especially if the stable is in such a condition as to throw out taints, as the milk will take up these taints and hold them and they will go into the butter. Another reason why the milk should not be left in the stable is, it will cool and when strained it will have been reduced in its temperature. As a rule, however, when the milk is set for cream, the extremes of temperature between the setting and the cooling whether by ice, cold water, or in the temperature of the room, should be about forty degrees. The natural or normal heat is ninety-eight degrees when taken from the cow. The temperature in summer will fall, perhaps, to ninety degrees by the time the milk is strained and set. When this is the case the milk should be cooled down to fifty degrees at least. Many cool it down to forty-five degrees and even lower. The more the temperature is reduced the sooner the cream will rise, and it will come up very thin and the butter will not keep as well as when the cooling is not so rapid and the temperature reduced so low. Such thin cream requires more time to mature. When the milk is set in

open pans, and the conditions are such that there will be but a small reduction in the temperature, down to sixty degrees, perhaps, as is the case in winter quite often, the milk should be warmed, before setting, to a degree of temperature which will admit of a falling of almost forty degrees to reach the temperature of its surroundings. This is a good rule to apply in the setting of milk in pantries, or quite warm milk-rooms. By the falling of the temperature of the milk, the butter globules come to the surface more rapidly, as the water or the milk is made more buoyant, and this condition, while it does not make the butter globules any lighter, it makes, for the time being, a greater difference between them and the milk because they are not affected by the cold as soon as the water. A light stick will rise in the water sooner than a heavy one, and either would float better in salt water than in fresh, because the specific gravity of the salt water is the greater. So is that of the chilled milk; and this specific gravity is increasing as the milk is cooling, while the butter fats remain about the same in their weight.

In the autumn and in winter the milk is liable to become viscid, or thick and sticky. When this is the case the milk should be diluted with water from ten to fifteen per cent. The water may be warmed up to 110 degrees and the double purpose obtained of warming the milk and at the same time making it thinner so that the cream can rise more freely. Cream is also liable to be too dry and thick in cold weather, especially when raised on open pans. It will be found that the butter will separate better if such thick cream is made thinner and softened by the addition of warm (not hot) water. Water may be added to the extent of ten to twenty per cent of the bulk of the cream.

The time of creaming.—This should not exceed, as a rule, more than twenty-four hours, as the milk is liable to become sour, and then no cream can rise because the cream cannot push its way through obstacles, and the clots of sour milk are obstacles enough to hold it back. Sour milk is no help to cream. When it is slightly sour it does not injure it if it is churned at once,

but the trouble is the cream is very apt to be left too long in pans, and with this sour milk in it, it will rapidly become too much fermented in the cream pail and go off flavor. To be safe, and to have our business under full control, we should endeavor to so set our milk that the cream will all rise while the milk is still sweet. I am aware that a great deal of milk is set in common pans in our State, and under unfavorable conditions for the cream to rise before the milk becomes sour, and this I believe to be one of the main reasons why so much butter sent to market from private dairies is more or less rancid. I also know that when the conditions are favorable, and great care is exercised, as good butter can be made, and is made, under this system as by any other. Butter so made, and perfectly made, has excellent keeping qualities as the cream is ripened while in the pans by aeration. A great deal of butter is also made by a more wholesale system of large shallow pans and open pans, set so that cool water can run all around them. When the water is as cool as fifty degrees or below, as it sometimes is to forty-eight degrees, the cream will rise well, provided the milk is warm when it is set. Usually it is too cool to insure a full creaming. I must recommend to all such factories to warm up the milk before setting so as to secure the extremes I have named. From all the contingencies which are liable to arise, I think the creamer system and cooling the milk with ice or very cold water is the safest way to get the most cream and to keep it sweet so it can be handled to the best advantage. The sweet skim-milk is soluble and has more nutriment in it than sour milk. When any of the sugar in milk, or in any other food, is turned to acid, it has lost just so much of its feeding value. In the winter time if the foods of the cows have been well balanced, the milk may set for thirty-six hours for the cream to rise, if it does not become sour or bitter. If left too long milk will become bitter, and so will the cream, owing to the presence of tannin in the hay, timothy especially. With long setting the tannin will separate from the other elements and become an active principle. There is also danger of the milk becoming separated and the most and longest coagulated changing

into little pellets of cheese, which go into the cream and remain intact in the butter causing white specks. The cream, also, will dry out and become hard on the edges of the pan and turn white, become bleached in the strong light and also make white specks. Covering the cream will prevent this. There is no good argument in favor of the long setting of milk to get the cream, for it cannot be done without too many risks and too much injury to the cream to sustain the practice.

Handling the cream.—This is a delicate part of the process of butter making. If the cream is sour when taken from the milk it should be churned at once, and all of the cream which is sour before skimming can go into the churn together. If part of the cream is sweet that is a different thing. Sweet or unripe cream should never be mixed with sour cream before going into the churn, as they will not churn alike, and the butter will have two tastes or flavors, one of sweet cream and one of sour. The first skimming of cream should be kept in a cool temperature where it will undergo very little, if any, change, until the entire batch of cream designed for a churning is gathered, and then it should be well mixed and be set into a warmer temperature, where it will develop acidity in twenty-four or thirty-six hours. As a rule cream should be churned when not more than thirty-six to forty-eight hours old. In warm weather it may be best to churn every twenty-four hours. No exact time can be given for the cream to remain in the cream pail before churning. If the time for collecting a churning has been long, then the cream should be put into a temperature from seventy to eighty degrees and be kept there in order to hasten its ripening. If the time of gathering has been more rapid, not exceeding twenty-four hours, it may be left to ripen more slowly, and thirty-six to forty-eight hours may be allowed. This can be brought about by putting the cream in a moderately cool atmosphere of fifty-five to sixty-five degrees. The process called ripening is giving the cream time enough to slowly thicken and to develop a small amount of lactic acid. This is not a rank sourness, but a pleasant acidity, which, when slowly developed, is not rank, nor

does it send up such an amount of carbonic acid gas as to affect the looks and quality of the cream. A great deal of cream is spoiled under the head of ripening, because so many people think that acidity or sourness is ripening. It is not so in any such sense. Aeration and a slow development of a moderate taste and flavor of lactic acid is ripening, coupled with a thickening of the cream and the developing or manufacture of the volatile oils, which constitutes such a small per cent of butter, but which are never at their best unless these conditions are observed. Extreme acidity results in no aroma or flavor except the aroma and flavor of sourness, coupled with a cheese taste and smell, or, as some term it, a sour-milk flavor. Such butter is never gilt-edged. The expert butter maker can tell well-ripened or perfectly matured cream at a glance. It has an appearance of its own. A bright, satiny and buttery look. Sour cream looks dull and rank. The butter maker must study this matter of ripening from his or her standpoint of breed of cows, manner of creaming, and all the surrounding conditions. There must be a constant effort to obtain perfection, and when it is reached the same method and painstaking must be followed all the time as far as circumstances will allow.

Churning.—This will require some variation in the temperature accordingly as the cream is sour or sweet. Acidity seems to be an aid in the separation of the butter globules, and churning is more readily done. The cream in which the butter globules are small seem to require a higher temperature. I suppose this admits of the globules adhering more freely, just as they do in winter when the cream is warm, and as they will not readily if the cream is cold. The cream from any milk should, as a rule, be churned at a temperature of sixty-two degrees in summer and at sixty-four to sixty-six degrees in cold weather. In summer the butter should be cooled to fifty-eight degrees before taking it from the churn, and in winter it may be higher, and should be, to work well, say sixty degrees. If too cold it will not gather or adhere in the worker, and if too warm it will possess little, if any, grain. Churning should be moderate in motion and should take from twenty to thirty minutes.

Making the butter.—This is a simple process, but still it must be done well. If the churn is stopped when the butter is in small granules, it can be thoroughly cleansed from the buttermilk and the atoms of casein. This can better be done with a first course of brine after the buttermilk has been drawn off.

The brine will also harden the granules better than water and cut or clear the buttermilk from the butter more effectively than water alone. The butter should be washed in three or more waters, or until the water comes away clear. The work of cleaning the butter can be expedited by stirring the granules about in the churn with a paddle. A fine sieve will prevent the butter from wasting. The washing should always be done with the purest and best water. Soft water is preferable, as the lime in water will, if it is very strong, impart its flavor to the butter just as it does when there is considerable of lime in the salt used. A churn which is the most convenient in form and brings the butter by concussion is the best.

Working and salting.—This should be done without delay, as it does butter no good to stand exposed to the air. When well washed the working is not to get the buttermilk out, but to get the salt evenly incorporated in the butter. The working should be just enough to accomplish this object and then it should cease, as the more butter is worked beyond this point the poorer it will be. When the butter is washed clean it will be quite dry and the butter will, if it is well granulated, be so open or porous that the salt will find its way quite evenly through it and be turned into brine, which will, when the butter is pressed together, carry out with it what little buttermilk there may be in it. Some people work butter twice, in order to be sure that the salt is perfectly distributed throughout it, but this is not necessary, as a careful granulation and salting and moderate working will insure its freedom from spots or streaks which are caused by not mixing the salt evenly through it. A fluted roller running on a wooden table is the most handy and effectual butter-worker. The general rule is an ounce of salt to a pound of butter.

The packing should be done as soon as the working is completed, while the butter is still plastic, and to keep it from the air and the damage of possible taints and the accession of the bacteria which produce putrefaction. The best package for long keeping is an oaken or ash tub. Spruce tubs do very well and are some cheaper. Under any circumstances the butter should not be put into the tub until it, the tub, has been soaked in scalding hot brine, and the tub should always be new. The butter should be covered with a salt paste and oil paper, and be kept in a dry, cool storeroom. A great deal of butter is spoiled by holding it in damp, moldy and unfit cellars.

There are some important things not to do, and among them is not to allow cows to feed in pastures full of rank and savory weeds, to drink out of stinking pools or impure water. All dead animals will taint the air, and consequently none should be left for any length of time on top of the ground. To keep the stables filthy and not to scald all the milking and cream vessels and worker and churn frequently is to invite and keep alive the germs of ferment and putrefaction. This sort of perpetuation of the butter-maker's worst enemies must not be done. We must not expect to make all of our butter in the summer, when everybody else is doing the same thing, and calculate on as good returns as we would get if we extended the business through the winter. We cannot reasonably complain of low prices if we persist in making the kind of butter consumers do not want at the present time, and we should not put off the changing of methods with the idea that our way is best, for improvements and a progressive spirit do not wait nor travel backwards.

Feeding rations.

The following milk rations are recommended by Professor E. W. Stewart, of New York, and will also be found in the Fifth Annual Report of the New York State Dairy Commissioner.

No. 1. Eighteen pounds oat straw; five pounds bean straw; six pounds cotton-seed meal.

No. 2. Twenty pounds barley straw; five pounds pea straw; two pounds wheat bran; five pounds linseed meal.

No. 3. Twenty pounds poor hay; five pounds corn meal; five pounds cotton-seed meal.

No. 4. Twenty pounds wheat straw; five pounds wheat bran; three pounds corn meal; four pounds linseed meal.

No. 5. Twenty pounds fresh marsh hay; five pounds corn meal; five pounds cotton-seed meal.

No. 6. Ten pounds good meadow hay; ten pounds rye straw; three pounds wheat bran; five pounds linseed meal.

The following are given by the same author as milk rations:

No. 1. Ten pounds clover hay; ten pounds straw; four pounds linseed-oil-cake; four pounds wheat bran; two pounds cotton-seed meal; four pounds corn meal.

No. 2. Sixteen pounds meadow hay; eight pounds wheat bran; two pounds linseed meal; six pounds corn meal.

No. 3. Eighteen pounds corn fodder; eight pounds wheat bran; four pounds cotton-seed meal; four pounds corn meal.

No. 4. Fifteen pounds straw; five pounds hay; four pounds cotton-seed meal; four pounds bran; four pounds corn meal; three pounds malt sprouts.

No. 5. Ten pounds corn fodder; ten pounds oat straw; two pounds linseed meal; four pounds malt sprouts; ten pounds oat and corn meal.

No. 6. Sixty pounds ensilage; five pounds hay; two pounds linseed meal; four pounds bran.

Fattening rations.

The following rations are for a thousand pounds of live weight of the animals fed:

No. 1. Eighteen pounds winter wheat straw; forty pounds corn-sugar meal; four pounds cotton-seed meal.

No. 2. Twelve pounds oat straw; ten pounds wheat bran; forty pounds corn-sugar meal.

No. 3. Twelve pounds clover hay; six pounds oat straw; forty pounds corn-sugar meal; two pounds linseed meal.

No. 4. Fifteen pounds corn fodder; five pounds malt sprouts; three pounds corn meal; forty pounds corn-sugar meal.

No. 5. Twenty pounds best clover hay; fifty pounds corn-sugar meal.

No. 6. Twenty pounds wheat straw; eight pounds timothy hay; six pounds cotton-seed meal.

No. 7. Twenty pounds corn fodder; six pounds Indian corn; six pounds linseed meal.

The following are rations for oxen at hard work, as given by Professor Stewart:

No. 1. Twenty pounds best meadow hay; ten pounds corn meal.

No. 2. Twenty pounds corn fodder; five pounds clover hay; two pounds wheat bran; three pounds cotton-seed meal.

No. 3. Seventeen pounds clover hay; three pounds wheat bran; ten pounds corn meal.

No. 4. Twenty-five pounds oat straw; five pounds wheat bran; four pounds linseed meal.

The following feeding rations are taken from Bulletin No. 17, new series, October, 1889, issued by the New York Agricultural Experiment Station:

	Pounds	Albumi- noids, pounds.	Carbohy- drates, pounds.	Fat, pounds.
Hay	18	.54	6.82	.22
Wheat bran	5	.64	2.22	.22
Linseed meal	5	1.37	1.74	.36
....		2.55	10.78	.80

Nutritive ratio, 1 :4.9.

Cost per day, 20.6 cents.

Value of fertilizing matter in ration, 14 cents.

	Pounds.	Albumi- noids, pounds.	Carbohy- drates, pounds.	Fat, pounds.
Hay	18	.54	6.82	.22
Wheat bran	5	.64	2.20	.12
Corn meal	3	.19	1.84	.10
Cotton seed meal	2	.72	.32	.27
....		2.09	11.18	.71

Nutritive ratio, 1: 6.2.

Cost per day, 19.6 cents.

Value of fertilizing matter in ration, 13 cents.

	Pounds.	Albumi- noids, pounds.	Carbohy- drates, pounds.	Fat, pounds.
Hay	20	.61	7.59	.24
Gluten meal	2	.31	1.03	.12
Wheat bran	5	.64	2.20	.12
Linseed meal	3	.82	1.04	.19
....		2.38	11.86	.67

Nutritive ratio, 1: 5.7.

Cost per day, 21.7 cents.

Value of fertilizing matter in ration, 13 cents.

	Pounds.	Albumi- noids, pounds.	Carbohy- drates, pounds.	Fat, pounds
Hay, red clover	18	1.07	6.12	.27
Wheat bran	5	.64	2.20	.12
Corn meal	6	.38	3.69	.20
Linseed meal	1	.27	.35	.07
....		2.36	12.36	.66

Nutritive ratio, 1: 5.9.

Cost per day, 21.3 cents.

Value of fertilizing matter in ration, 14 cents.

	Pounds.	Albumi- noids, pounds.	Carbohy- drates, pounds.	Fat pounds,
Hay	15	.48	5.69	.18
Wheat bran	5	.64	2.20	.12
Corn meal	5	.32	3.07	.16
Linseed meal	3	.82	1.04	.19
.....		2.26	12.00	.65

Nutritive ratio, 1: 6.

Cost per day, 21.5 cents.

Value of fertilizing matter in ration, 13 cents.

	Pounds.	Albumi- noids, pounds.	Carbohy- drates, pounds.	Fat, pounds.
Hay, red clover	8	.48	2.72	.12
Wheat straw	5	.04	1.73	.02
Ensilage, maize	30	.15	2.52	.24
Wheat bran	4	.57	1.72	.10
Corn meal	3	.19	1.84	.10
Cotton-seed meal	2	.72	.32	.27
.....		2.15	10.85	.85

Nutritive ratio, 1 : 6.2.

Cost per day, 19.3 cents.

Value of fertilizing matter in ration, 12 cents.

	Pounds.	Albumi- noids, pounds.	Carbohy- drates, pounds.	Fat, pounds.
Wheat straw	20	.15	6.93	.07
Maize ensilage	30	.15	2.52	.24
Cotton-seed meal	2.5	.89	.40	.33
Linseed meal	1	.27	.35	.06
Wheat bran	4	.51	1.76	.10
.....		2.33	11.96	.80

Nutritive ratio, 1 : 7.1.

Cost per day, 18 cents.

Value of fertilizing matter in ration, 11 cents.

	Pounds	Albumi- noids, pounds.	Carbohy- drates, pounds.	Fat, pounds.
Hay	15	.46	5.69	.18
Oats	5	.45	2.12	.20
Linseed meal	3	.82	1.04	.20
Corn meal	5	.32	3.07	.16
.....		2.05	11.92	.74

Nutritive ratio, 1 : 6.2.

Cost per day, 22.7 cents.

Value of fertilizing matter in ration, 11 cents.

	Pounds.	Albumi- noids. pounds.	Carbohy- drates, pounds.	Fat, pounds.
Maize stover	20	.65	9.67	.16
Wheat bran	3	.38	1.32	.07
Linseed meal	4	1.10	1.39	.25
Roots	12	.15	.65	.03
.....		2.28	13.03	.51

Nutritive ratio, 1 : 6.3.

Cost per day, 16.1 cents.

Value of fertilizing matter in ration, 10 cents.

	Pounds.	Albumi- noids, pounds.	Carbohy- drates, pounds.	Fat, pounds
Maize stover	13	.42	6.28	.10
Ensilage	25	.12	2.11	.19
Cotton-seed meal	2	.72	.32	.27
Wheat bran	5	.84	2.20	.12
Starch waste (dry)	4	.23	1.15	.10
.....		2.13	12.06	.78

Nutritive ratio, 1 : 6.6.

Cost per day, 19.2 cents.

Value of fertilizing matter in ration, 11 cents.

The following feeding rations are some that have been fed by our New York farmers, and are published in the same bulletin above-mentioned:

ROCHESTER, N. Y.

Cows in herd, forty-nine; mostly Guernseys; average about six years old; average weight, 1,000 pounds, and cows go dry about six weeks.

Average milk yield in summer, fifteen quarts; average milk yield in winter, ten quarts.

Milk is all sold. At the time of report the daily feed was as follows:

	Pounds.
Corn stover	10
Corn ensilage	15
Sugar beets	10

	Pounds,
Corn meal	5
Wheat bran	5
Ground oats	5

The amount of digestible matter in such a ration would be about as follows:

	Pounds.
Albuminoids	1.38
Carbohydrates	14.32
Fat .....	.68

Nutritive ratio, 1 : 8.5.

The above ration, like most rations, according to German standards, is deficient in albuminoids and strong in carbohydrates.

ITHACA, N. Y.

Twelve cows, grade Holstein three-fourths to fifteen-sixteenths, averaging 1,122 pounds live weight, and were yielding, February eighteenth, on an average, thirty pounds milk per day.

Milk is all sold for immediate consumption.

The daily feed was as follows:

	Pounds.
Clover hay	9.58
Corn ensilage	42.
Mangolds	12.2
Corn meal	2.8
Wheat bran	2.
Cotton-seed meal	3.66

The digestible matter contained would be approximately as follows:

	Pounds.
Albuminoids	2.57
Carbohydrates	10.21
Fat	1.12

Nutritive ratio, 1 : 5.1.

The last ration, judged by the standard, would be considered well balanced, although the proportion of fat is in excess.

AVON, N. Y.

Nine grade Jerseys and one Holstein, weighing 1,000 pounds each. Cows go dry one to four weeks, and come in milk all the year round.

In summer the milk yield averages about eighteen quarts, and in winter ten quarts. The milk is all sold.

	Pounds.
Meadow hay (assumed).....	8
Corn stover (assumed).....	10
Bean straw	15
Beets .....	....
Corn meal	8
Wheat bran	8
Linseed meal	1

The amounts of hay, stover and straw are not given, but from report apportioned as above.

It is hardly possible that the animals consumed all the coarse food as indicated above as, when fed straw, a portion is generally uneaten.

As the figures stand, the digestible matter would be:

	Pounds.
Albuminoids	2.77
Carbohydrates	17.50
Fat .....	.76

Nutritive ratio, 1 : 6.9.

The grain ration indicated is a very liberal one, and the total amount is in excess of the standards, but the proportions lean toward carbohydrates.

BROCKPORT, N. Y.

Twelve cows in herd; Jersey breed, and cows go dry about one month.

Annual butter product, per cow, 320 pounds.

The feed per day when reported was as follows:

	Pounds.
Meadow hay	12
Corn meal	3
Wheat bran	3
Linseed meal	3
Oatmeal	3

The proprietor writes that he feeds more of fodder corn than hay. The corn fodder taking the place of hay, and cows have all they will eat, the grain being the same, he sees no difference in results.

The digestible matter contained in the above ration is found to be as follows:

	Pounds
Albuminoids	2.03
Carbohydrates	10.03
Fat .....	.63

Nutritive ratio, 1 : 5.7.

This ration is very close to what American experience seems to indicate as a profitable and economical ration. The performance of the animals (320 pounds of butter per year) confirms the opinion. The ration employed is worthy of study by dairymen who wish to combine their foods in a profitable ration for milch cows.

HOLLAND PATENT, N. Y.

The herd consists of eleven Jerseys and grade Jerseys. Cows go dry about three weeks, and come in milk at all seasons.

Average annual milk yield, about 5,000 pounds.

Average butter per cow, annually, 300 pounds.

The following was the ration fed at date of report:

	Pounds.
Meadow hay	3
Corn ensilage	40
Wheat bran	4
Cotton-seed meal	2

The above ration calculated for digestible matter is as follows:

	Pounds.
Albuminoids	1.52
Carbohydrates	6.59
Fat .....	.71

Nutritive ratio, 1 : 4.5.

According to German standards this ration would be considered perfectly balanced as regards the relation of albuminoids to carbohydrates. The interesting feature is the small amount of dry matter consumed per day by the animals. When we consider the returns given by the cows, an average annual butter product of 300 pounds, it is evident the food is well digested and assimilated by the animals.

The following feeding rations have been clipped recently from the pages of "The Country Gentleman":

	Albumi- noids, pounds.	Carbo- hydrates, pounds.	Fat, pounds.
Thirty pounds sweet corn ensilage .....	.36	3.60	.15
Five pounds common hay.....	.20	1.76	.05
Eight pounds ground damaged wheat...	.77	5.28	.14
Four pounds hominy chops.....	.32	2.04	.21
Three pounds cotton-seed meal.....	1.05	.66	.18
Total	2.70	13.34	.73

This has a nutritive ratio of 1 to 5.5, and is an excellent milk and butter ration, and with good cows should produce an excellent yield.

	Albumi- noids, pounds.	Carbo- hydrates, pounds.	Fat, pounds.
Fourteen pounds clover hay .....	.98	5.60	.21
Six pounds corn meal .....	.50	3.78	.29
Four pounds ground oats .....	.36	1.84	.16
Four pounds fine bran .....	.47	1.84	.10
Two pounds linseed meal .....	.56	.60	.12
Total	2.87	13.66	.88

This has a nutritive ratio of 1 to 5.5. In this case the clover hay must be cut and moistened, and the ground oats, corn meal, fine bran, linseed meal mixed thoroughly with it and given in three feeds. This should produce the best flavored milk and butter, and keep the cow in fine health and condition.

	Albumi- noids, pounds.	Carbo- hydrates, pounds.	Fat, pounds.
Sixteen pounds meadow hay .....	.86	6.56	.16
Eight pounds ground corn and rye ....	.69	5.12	.19
Six pounds bran .....	.70	2.76	.15
Two pounds cotton-seed meal .....	.70	.44	.12
Total	2.95	14.88	.62

This has a nutritive ratio of 1 to 5.5, and will produce a good quality and large quantity of milk when fed to good cows.

	Albumi- noids, pounds.	Carbo- hydrates, pounds.	Fat, pounds.
Sixteen pounds short cut corn fodder..	.30	5.25	.07
Five pounds clover and timothy .....	.30	2.00	.07
Nine pounds ground corn, rye and oats..	.76	5.23	.28
Ten pounds wheat bran	1.17	4.46	.15
Total	2.53	16.94	.57

But this is better:

	Albumi- noids, pounds.	Carbo- hydrates, pounds.	Fat, pounds.
Twelve pounds corn fodder .....	.24	4.20	.06
Five pounds clover and timothy .....	.30	2.00	.07
Nine pounds corn, rye and oats .....	.76	5.23	.28
Eight pounds wheat bran .....	.94	3.60	.12
Two pounds cotton-seed meal .....	.70	.44	.12
Total	2.94	15.47	.65

The first ration has a nutritive ratio of 1 to 7.4, while second ration has a ratio of 1 to 5.7. The latter ration would probably cost but a trifle more.

	Albumi- noids, pounds.	Carbo- hydrates, pounds.	Fat, pounds.
Fourteen pounds clover hay .....	.98	5.60	.21
Six pounds corn and oats .....	.52	3.11	.28
Eight pounds ground wheat screenings ..	.72	4.32	.20
Fifteen pounds pulped carrots .....	.21	1.87	.03
Total	2.43	14.90	.72

This has a nutritive ratio of 1 to 6.8, a little too wide for the best butter ration. But if we substitute two pounds of cotton-seed meal for two pounds of wheat screenings, we narrow the nutritive ratio down to 1 to 5.4, a very good butter ration.

The following ration is for cows and horses:

	Albumi- noids, pounds.	Carbo- hydrates, pounds.	Fat, pounds.
Forty pounds corn ensilage .....	.48	4.80	.21
Eight pounds meadow hay .....	.43	3.28	.08
Eight pounds wheat middlings .....	.93	3.92	.21
Three pounds cotton-seed meal	1.05	.66	.18
Total	2.89	12.66	.68

This has a nutritive ratio of 1 to 5.

It would not be safe to feed brood mares much cotton-seed meal, especially while in foal. Horses may have two pounds of cotton-seed meal per day safely, and brood mares the same when suckling foal. He may make up the following ration for his horses: Four pounds cut corn fodder; eight pounds cut millet hay; ten pounds wheat middlings or ground oats; and the horses that are subjected to regular work may have two pounds of cotton-seed meal.

It must be understood that the cut corn fodder and millet hay are slightly moistened, and the wheat middlings and cotton-seed meal well mixed in and given in three feeds, smallest at noon.

Cotton-seed meal must not be fed to horses without mixing with coarse fodder. It will soon produce colic and congestion.

Brood mares without labor may be fed the above amount of coarse fodder, with six to eight pounds of wheat middlings mixed in, according to size and condition. This would keep them in condition and health.

DAIRY LAWS.

The following provisions of our dairy laws are worthy of careful attention, because they are in the interest of both the producer and consumer. The price, quality and reputation of our State dairy products can only be maintained by faithful observance of these enactments.

Chapter 183 of the Laws of 1885, as amended, enacts as follows:

"No person or persons shall sell or exchange, or expose for sale or exchange, any unclean, impure, unhealthy, adulterated or unwholesome milk, or shall offer for sale any article of food made from the same, or cream from the same. The provisions of this section shall not apply to skimmed milk sold for use in the county in which it is produced, and in the adjoining counties, except in New York and Kings counties (where it shall apply), provided it is sold for and as such. This provision shall not apply to pure skim cheese made from milk which is clean, pure, healthy, wholesome and unadulterated, except by skimming." (Section 1.)

It also contains the following provisions: "No person shall keep cows for the production of milk for market, or for sale or exchange, or for manufacturing the same, or cream from the same, into articles of food, in a crowded or unhealthy condition, or feed the cows on food that is unhealthy or that produces impure, unhealthy, diseased or unwholesome milk. No person shall manufacture from impure, unhealthy, diseased or unwholesome milk, or of cream from the same, any article of food." (Section 2.)

"No person or persons shall sell, supply or bring to be manufactured to any butter or cheese manufactory, any milk diluted with water, or any unclean, impure, unhealthy, adulterated or unwholesome milk, or milk from which any cream has been taken

- (except pure skim milk to skim cheese factories), or shall keep back any part of the milk commonly known as 'strippings,' or shall bring or supply milk to any butter or cheese manufactory that is sour (except pure skim milk to skim cheese factories)." (Section 3.)

Any disobedience of these provisions is a misdemeanor punishable by fine or imprisonment, or both, and also renders the violator liable to the civil penalty imposed by statute.

It has been shown by experience that where milk is kept for a certain length of time to ripen to be made into cheese or butter there are certain elements in it which are supposed to represent the waste in the process of secretion, which interferes with the process of ripening detrimentally.

Scientists tell us that this ripening is brought about by the development of germs which get into the milk from the atmosphere and surroundings as soon as it is drawn.

It is well understood that the souring of milk is brought about by the lactic acid germ. There are various kinds of these minute growths that give rise to various changes. In pure milk the conditions are such that only the germ develops which gives rise to what are known as the natural changes or the changes desired to produce the conditions favorable for making good cheese or butter.

It is found that the best means of getting rid of these deleterious elements, animal odors and gases, is by thoroughly aerating the milk immediately after it is drawn from the cow.

This we have endeavored to impress upon the farmers and dairy-men everywhere and we are pleased to state aeration of milk is being practiced quite extensively among the dairymen of the State.

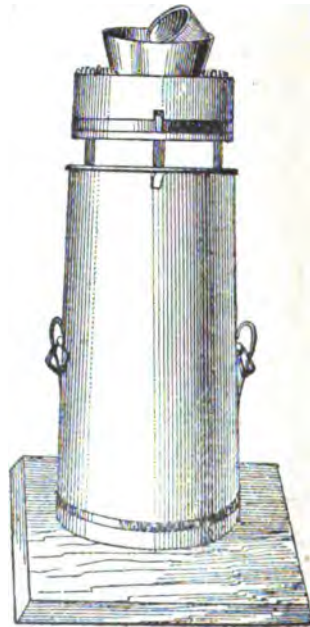
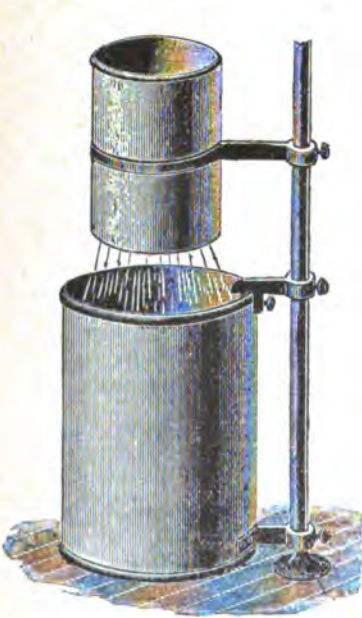
There are some though who object to it because they have not obtained favorable results; in every instance where we have been enabled to ferret out the cause it has been that they have performed this operation in an atmosphere charged with impurities, and so, of course, conveyed those impurities to the milk; for

instance, they have aerated in a place where the air first passed over a heap of manure immediately before it reached the milk, or near a hog-pen or in some other equally tainted atmosphere.

Some again do not aerate until after the milk has stood for some time closed up and becomes advanced in putrefaction before the operation is performed, this aeration, of course, would benefit but not purify the milk.

Others again will mix the aerated nights' milk with unaerated mornings' milk which may be tainted and thus taint the whole mass.

Cooling is also beneficial to the milk if it has been thoroughly aired before cooled. If cooled first the gases will be so condensed or impure changes will have started in the milk which cannot be removed by aeration.

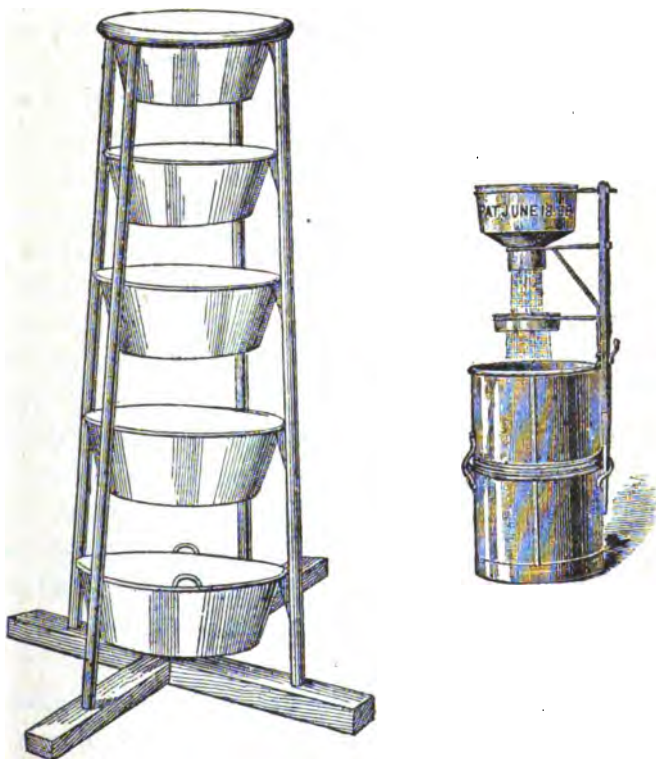


MALLERY REVERSIBLE CAN COVER.

While there are changes that will take place in milk to its detriment in spite of aeration yet it has proven to be the best known means of treating milk in order to free it from impurities.

There are in existence many devices on the market, for accomplishing aeration; the simplest of all methods would be to pour milk from a dipper elevated to a certain height above the receiver; the better way, however, would be to break up the milk into fine particles and expose it to the largest quantity of air possible.

The device which will break up the milk into the finest particles and expose it to the most air in a reasonable length of time would, of course, fulfill the requirements best. For the purpose of illustrating the principle more fully we present, on this and the preceding page, cuts of aerators which have come to our notice.



MALLERY AERATOR.

It has been estimated that the neglect to aerate milk to be made into cheese has cost the dairymen in this State thousands of dollars by lowering the standard of New York State cheese.

It is undisputed that the more uniformly high the standard of cheese the better the price which it will bring. If we can suc-

ceed in producing a uniform first-grade cheese in each factory in our State the reputation which will attach to the product will not only guarantee a good price but also a steady demand.

In order to secure good milk it is necessary to see that the cow and her surroundings are healthy. We have, in a former annual report, given a short resume of what is considered by the most advanced dairymen to be the best rations for producing rich, pure, healthy milk.

We stated in relation to this in our seventh annual report the following. (See seventh annual report, page 53.)

The future of cheesemaking, as well as that of co-operative butter making demands co-operation on the part of the producers, that is, they should, as nearly as possible, each for himself, have his cows in the best possible condition for producing a good quality of milk, and feed them upon rations well tended toward that end. It is no wonder that results are so unsatisfactory when we consider the heterogeneous character of the feed and the cows.

It is, in my judgment, impossible to produce milk containing nearly uniform ingredients from feeding materials which are very unlike in their constituents. I am more and more convinced that certain foods are calculated to produce certain results. There is no more important work for experimenters than to determine what foods will produce the best and most cheese and butter. Future profits and high standard rest upon this basis. I have made this a special line of instruction because clearly of the opinion that poor food mixed at random, and pastures filled with noxious weeds, are among the chief causes of the large portion of unsatisfactory products.

There is an increasing dissatisfaction among patrons of co-operative factories in regard to the comparative value of milk.

Many farmers have not selected or tried their cows for the quality of their milk, but rather for the quantity given. This is one of the chief reasons why more milk is required to make a pound of cheese than formerly. Some farmers furnish their cows with better food than others will; lack of proper nourishment will cause the milk to contain less in solids. Such milk weighs,

but it does not make as much cheese in proportion to its weight as milk from cows fed on nutritious foods.

The past years' experience has only confirmed us in the above views. We, therefore, have continued to impress upon the dairy-men the necessity of keeping their cattle in a healthy state and in healthy surroundings, as we believe an unhealthy cow cannot produce a healthful product of milk, and we have given detailed instructions of the importance of cleanliness, good water, comfortable quarters, sunlight, good air and a moderate amount of exercise.

Much of this instruction to the farmers has been imparted while our experts were engaged in the factory in actually making cheese for the purpose of instructing and aiding the maker. The intervals occurring in the process were occupied in giving instruction to the patrons as to the best methods of caring for their milk.

They have gone from factory to factory and exemplified that system of making cheese which we have found to produce the best results; and have endeavored to acquaint the maker with the influences which modify the condition of the milk and interfere in the making of the quality of cheese desired, and how to remove them, if possible; and, if not, then how to combat them, thus teaching them to get and keep control of the materials they are manipulating.

For instance, a contrivance is used which, at the same time, proves the efficacy or otherwise of the rennet and also the condition of the milk as to ripeness. It is a floating tin cup loaded at the bottom with solder so that it will hold eleven ounces of milk.

This cup is partly filled from the milk which is to be worked and then is placed in the vat of milk and allowed to float around so as to keep its condition the same as that of the milk in which it floats.

A definite amount of rennet is added to the milk in the cup and the effects are carefully noted. This enables them to determine with exactness the time at which to add rennet to that particular

milk to produce the desired results. In a similar manner every detail of the process of cheesemaking is exemplified by actual work. These details are set forth more fully in the report of the cheese instructors attached hereto.

When this knowledge is possessed by every farmer and cheesemaker throughout the State the full benefits of the co-operative system will be more nearly obtained.

Co-operation means more than the simple taking of the milk from many dairies to one factory and throwing it together in one vat and making it up into indifferent cheese and dividing the proceeds.

It does mean that the maker and the milk producer should co-operate in their efforts in every possible way that would tend to bring about the production of the best possible grade of cheese.

This is not only a mutual obligation that these people owe to each other from a financial standpoint, but it is one that they owe also to the consuming public.

Since the passage of the act requiring the dairy commissioner to issue to the different cheese manufacturers in the State of New York, upon proper application therefor, a full cream cheese brand bearing a suitable device or motto, brands have been issued in compliance with that act to nearly 1,500 different factories. It has come to be understood generally among the dealers that a product bearing one of these brands is a full cream cheese without doubt. This has given such cheese a standing in the market which others do not have, and has, therefore, created a demand for its use which is constantly growing.

We have had a few complaints of the illegal use of this brand, although all the cheese upon which it has been used has to run the gauntlet of the careful inspection not only of those in charge of the enforcement of the law, but of the practical inspection of men of years of experience in handling and buying this commodity. In one case in which complaint has been made we have been as yet unable to determine sufficient facts to enable us to prosecute; in another instance complaint has been made

to this office that parties were buying up old boxes bearing the impress on the brand issued to one factory and using the same boxes in which to sell cheese produced by a different factory, and that they did not erase the stamp upon the box. This complaint sets forth the fact that it is an injury to the party manufacturing cheese who has a right to use the brand. This complaint was made quite recently and is being investigated, and such action will be taken as, under the statute, will best tend to stop this misuse of our brand.

It is believed by persons who are in a position to give an opinion, that the use of this brand upon our full cream cheese product has given it a standing, not only at home but abroad, which proves, beyond a doubt, the propriety of the action of your honorable body in providing for its use. It is not uncommon to meet foreign buyers who express great confidence in the dairy products of the State of New York. The invariable reason given is, that the State authorities have provided against adulterations, or imitations, or impositions, and provided for the branding of the true product so that it can be easily distinguished from any other. The following is a list of factories, with their addresses, which have used the State brand during the past season:

ALLEGANY COUNTY.

NAME OF FACTORY.	Applicant.	Post-office.
Abbotts No. 1.....	I. N. Sheldon.....	Cuba.
Abbotts No. 2.....	I. N. Sheldon.....	Cuba.
Alfred Center.....	Alvin C. Baker.....	Alfred Centre.
Alfred.....	E. J. Fenner.....	Alfred.
Allegany.....	I. N. Sheldon.....	Cuba.
Allen.....	J. R. Lamont.....	Angelica.
Allentown Gilt Edge.....	Allen & Wetherbee.....	Allentown.
Almond.....	A. J. Fenner.....	Almond.
Amslen.....	Leman Sizer.....	Cuba.
Andover.....	W. F. Snyder.....	Andover.
Angelica Union.....	W. L. Hogg.....	Angelica.
Baker.....	James A. Baker.....	Angelica.
Barr.....	J. P. Barr.....	Friendship.
Belfast.....	A. E. Perry.....	Belfast.
Bishopville.....	A. L. McIntosh.....	Almond.
Black Creek.....	E. M. Beebe.....	Black Creek.
Brookside.....	M. E. Gordon.....	Rushford.
Burt.....	R. B. Jerman.....	West Allen.
Caneadea.....	Young & Young.....	Fillmore.
Clarksville Center.....	M. M. Congdon.....	West Clarksville.
Cryder Creek.....	Elmer S. Wood.....	Whitesville.
Cuba Valley.....	Halstead & Wasson.....	Cuba.
Deyden Ridge.....	John L. Coyle.....	Andover.
East Friendship.....	W. A. Dayton.....	Friendship.

East Hill	E. P. Jewell	Caneadea.
Elm Valley	U. W. Stratton	Elm Valley.
Empire	W. E. Child	State Road.
Fillmore	Young & Young	Fillmore.
Five Corners	E. P. Fenner	Alfred.
Forest	Will H. Reid	Obi.
Genesee Valley	W. Ward Rice	Friendship.
Gilt Edge	F. J. Brown	Belmont.
Gynn	Snyder Bros.	Andover.
Halls, A. E.	A. E. Hall	Scio.
Hallsport	T. J. Carmody	Cuba.
Hardys	J. G. James	Rushford.
Hedgesville	T. J. Carmody & Co	Cuba.
Home	I. N. Sheldon	Cuba.
Houghton	Peter Loftus	Houghton.
Hume	E. A. Hammond	Hume.
Independence	Charles F. Potter	Independence.
Jasper	T. J. Carmody & Co	Cuba.
Kar Valley	Walter McHenry	Karsdale.
Kellogg	Orem Edson	Caneadea.
Kellor Hill	O. J. Reynolds	Black Creek.
Keystone	M. H. Crofoot	Aristotle.
Lafferty	James Loftus	Black Creek.
Little Genesee	C. A. Thompson	Little Genesee.
Marshall	John R. McVoy	Marshall.
McGrawville	F. W. Hogg	New Hudson.
McHenry Valley	E. P. Fenner	Alfred.
Mill's Mills	R. S. Roller	Hume.
Mt. Munroe	A. S. Olthof	Rushford.

ALLEGANY COUNTY — (Concluded).

NAME OF FACTORY.	Applicant.	Post-office.
Murray's Corners.....	Bernard Murray.....	Andover.
New Hudson Centre.....	M. J. Dunn.....	Black Creek.
North Cuba.....	O. J. Warren.....	Cuba.
Oramel.....	A. E. Perry.....	Belfast.
Phillips Creek.....	C. S. Richardson.....	Phillips Creek.
Piatt.....	Fred R. Piatt.....	Short Tract.
Pleasant Valley.....	H. G. Edwards.....	Alfred.
Pleasant Valley.....	O. J. Folts.....	Cuba.
Rice.....	Herman Rice.....	Friendship.
Richburgh.....	Frank H. Coyle.....	Richburgh.
Rockville.....	A. E. Perry.....	Belfast.
Rush Creek.....	C. K. Farnsworth.....	Fillmore.
Sherman.....	F. M. Sawyer.....	Nile.
Short Tract.....	Young & Young.....	Fillmore.
Slater Creek.....	E. E. Swain.....	Canaseraga.
Smith.....	Curtis Smith.....	Bolivar.
South Bolivar.....	A. A. Sizer.....	South Bolivar.
South Cuba.....	G. S. Marsh.....	Cuba.
Spring Brook.....	M. J. Sands.....	Cuba.
Spring Mills.....	C. H. Austin.....	Spring Mills.
Star.....	D. M. Hancock.....	Centreville.
Stone Spring.....	John Henry Boller.....	Hume.
Transit Bridge.....	E. S. Chamberlain.....	Transit Bridge.
Trapping Brook.....	Herman Lebar.....	Wellsville.

Vandermark No. 1.....	G. E. Dodge	Scio.
Vandermark No. 2.....	G. E. Dodge	Scio.
West Almond.....	Jay Cartwright.....	West Almond.
West Hill	Ernst. Heker.....	West Allen.
West Nile	Costell. & Wygant	Nile.
White Creek	W. E. Wilkinson	Belfast.
Wildman	J. H. Wood	Whitesville.
Woodhull.....	T. J. Carmody & Co	Cuba.

BROOME COUNTY.

Chenango.....	G. H. Littlewood	Lisle.
Holcomb	S. A. Holcomb	Tunnel.
Johnson	L. A. Gross	Greene.
Lester	E. B. Hall	Lester.
Miller	H. L. Miller.....	North Fenton.
Wes. Windsor.....	De Witt Hall	West Windsor.
Windsor Creamery	C. H. Kent.....	Windsor.

CATTARAUGUS COUNTY.

Abbotts Union	John Hoag.....	Abbotts.
Ashford	J. M. Zeilman	Ashford.
Axville	O. S. Wright.....	East Randolph.
Bel lows	A. B. Neff	Ashford.
Bullock	G. E. Hogg	Franklinville.
Champtin.....	W. M. Champtin	Little Valley.
Cold Spring	Wm. E. Smith & Co	Randolph.
Cottage	James Poland	Cottage.
Dayton	O. W. Catlin	Dayton.
Eagle	J. Gampp.....	East Otto.

CATTARAUGUS COUNTY — (Continued).

NAME OF FACTORY.	Applicant.	Post-office.
Eagle Village	Clark & Metcalf	Rawson.
East Leon	A. Howard	East Leon.
East Otto	J. Gampp	East Otto.
East Union No. 5	J. E. Hanson	Otto.
East Union No. 6	C. A. Facklam	Cattaraugus.
Elgin	D. J. Thompson	Elgin.
Elkdale	E. D. Morey	Elkdale.
Elm Creek	D. A. Gowan	East Randolph.
Farmersville	C. E. Wright	Laidlaw.
Farmersville	C. E. Wright	Laidlaw.
Fay Hollow	E. C. Alsworth	Hin-dale.
F. H. & Co. No. 1	F. Hufstader	Little Valley.
F. H. & Co. No. 2	F. Hufstader	Little Valley.
F. H. & Co. No. 3	F. Hufstader	Little Valley.
F. H. & Co. No. 4	F. Hufstader	Little Valley.
F. H. & Co. No. 5	F. Hufstader	Little Valley.
Five Mile Union	Elmore D. Bennett	Allegany.
Four Mile Union	John Geise, Jr.	Allegany.
Haskell Flats	Peter J. Pettit	Haskell Flats.
Highland	Wilbur A. Hopkins	Conewango.
Hopkins, I. M.	I. M. Hopkins	Portville.
Howards Corners	E. Brown	Wesley.
Irish Hill	A. B. Neff	Ashford.
Leon Centre	G. H. Burlage	Leon.
Lime Brook No. 1	P. F. Jark	Otto.

Lime Brook No. 2	P. F. Jark	Otto.
Lime Brook No. 3	P. F. Jark	Otto.
Lime Brook No. 4	P. F. Jark	Otto.
Lime Brook No. 5	Chas. J. Busekist	New Albion.
Lime Brook No. 5	E. T. Ryder	Otto.
Lime Brook No. 6	C. J. Busekist	New Albion.
Lower Haskell	James J. Kirby	Olean.
Marble Springs	E. D. Manwareing	Elton.
Maynard	J. Gamp	East Otto.
Napoli Narrows	J. C. Brigham	Little Valley.
North Leon	A. D. Ackler	Leon.
North Napoli	Eben Sibly	Napoli.
North Otto Union	Samuel Charlesworth	Otto.
North Valley	William Eddy	Little Valley.
Onoville	O. H. Marsh & Bro.	Onoville.
Patrons	O. A. Chase	Franklinville.
Peaceville	Daniel Newton	Leon.
Perrysburgh	R. McCubbin	Perrysburgh.
Plato Union	A. B. Neff	Ashford.
Pritchard	E. C. Pritchard	Cattaraugus.
Randolph No. 1	Zenas Carpenter	East Randolph.
Randolph No. 2	E. V. Carpenter	Randolph.
Randolph No. 3	Samuel Carpenter	Randolph.
Randolph No. 4	Thomas Carpenter	Conewango.
Randolph No. 5	Herman Ferrier	Conewango.
Rawson No. 1	F. M. Metcalf	Rawson.
Rawson No. 2	F. M. Metcalf	Rawson.
Riceville	A. B. Neff	Ashford.
Rock Spring No. 1	J. R. Holden	Franklinville.

CATTARAUGUS COUNTY — (Concluded).

NAME OF FACTORY.	Applicant.	Post-office.
Rock Spring No. 2	J. R. Holden	Franklinville.
Rock Spring No. 3	J. R. Holden	Franklinville.
Sample Hill	Wm. E. Smith & Co	Randolph.
Sandusky No. 1	J. B. Lewis	Sandusky.
Sandusky No. 2	J. B. Lewis	Sandusky.
Sandusky No. 3	J. B. Lewis	Sandusky.
Sandusky No. 4	J. B. Lewis	Sandusky.
Sandusky No. 5	J. B. Lewis	Sandusky.
Sandusky No. 6	J. B. Lewis	Sandusky.
Sandusky No. 8	J. B. Lewis	Sandusky.
Sandusky No. 9	J. B. Lewis	Sandusky.
Sandusky No. 11	J. B. Lewis	Sandusky.
Sandusky No. 12	J. B. Lewis	Sandusky.
Schmertze	A. B. Neff	Ashford.
Scott's Corners	C. B. Alsworth	Hinsdale.
Spring Valley	W. T. Peaslee	East Randolph.
State Line	J. S. Cornwell	Leek
Stone	D. J. Thompson	Franklinville.
Union	J. Gamp	East Otto.
Veddar's Corners	J. M. Zeilman	Ashford.
Wilson No. 1	L. A. Wilson	Ischua.
Wilson No. 2	L. A. Wilson	Ischua.
CATTARAUGUS COUNTY.		
Como	J. A. Shaver	Como.

Ira.....	E. H. Brigham.....	Cayuga.
Locke.....	S. S. Bemis.....	Locke.
North Victory.....	E. H. Ladd.....	North Victory.
Victory Association.....	W. W. Frazer.....	Victory.
CHAUTAUQUA COUNTY.		
Alden.....	A. D. Alden.....	Sinclairville.
Arkwright Center.....	Frank W. Horton.....	Arkwright.
Arkwright Union.....	Wm. E. Smith & Co.....	Laona.
Arkwright Valley.....	A. J. Cowden.....	Laona.
Bemus Point.....	Wm. E. Smith & Co.....	Bemus Point.
Block.....	John McAdam.....	Forestville.
Blockville.....	Geo. H. Smith.....	Blockville.
Canadua.....	Wm. E. Smith & Co.....	Fredonia.
Cards.....	H. C. Card.....	Clymer.
Casadaga Valley.....	Corwin T. Cross.....	Charlotte Center.
Centralia.....	Joseph D. Welder.....	Centralia.
Charlotte Center.....	F. L. Clark.....	Charlotte Center.
Charlotte Union.....	Owens M. Cleland.....	Charlotte Center.
Chautauqua.....	Gilbert N. Goldthwait.....	Hartfield.
Cipperleys.....	W. H. Cipperley.....	Moons.
Climax.....	A. E. Hale.....	Fluvanna.
Cordova.....	A. J. Cowden.....	Laona.
Cutting Brook.....	H. R. Case.....	Cutting.
Ellery.....	George I. Barnes.....	Ellery.
Ellington No. 1.....	E. F. Rowley.....	Kennedy.
Ellington No. 2.....	E. F. Rowley.....	Kennedy.
Ellington No. 3.....	E. F. Rowley.....	Kennedy.
Ellington No. 4.....	E. F. Rowley.....	Kennedy.
Ellington No. 5.....	E. F. Rowley.....	Kennedy.

CHAUTAQUA COUNTY—(Concluded)

NAME OF FACTORY.	Applicant.	Post-office.
Ellington No. 6	E. F. Rowley	Kennedy.
Empire	John McAdam	Forestville.
Farmers	C. J. Mason & Co	Conewango Valley.
Findley's Lake	A. C. Tillotson	Findley's Lake.
Forestville	John McAdam	Forestville.
Forestville Branch	John McAdam	Forestville.
Goshen	James Pardee	Harmony.
Keeler's Corners	Wm. F. Green	Sherman.
Laona	S. G. Bartlett	Laona.
Lewis	S. W. Lewis	Stockton.
Limwood No. 1	C. D. Leonard	Cherry Creek.
Limwood No. 3	C. D. Leonard	Cherry Creek.
Maple Hill Creamery	Delos Tanner	Hamlet.
Mayville	E. F. Rowley	Kennedy.
Mayville	E. F. Rowley	Kennedy.
Morgan's Corners	J. I. Parkhurst	Clymer.
Nashville	C. Montgomery	Nashville.
Red Bird	Wm. E. Smith & Co	Sinclairville.
Roods	Wm. E. Smith & Co	Charlotte Center.
Sheridan	John McAdam	Forestville.
Sinclairville	Wm. E. Smith & Co	Charlotte.
Stockton	H. B. Van Buren	Stockton.
Torrey	S. Torrey	Sinclairville.
Wait	Henry Wait	Cassadaga.
Walt's Flats	J. J. Colwell	Walt's Flats.

Warner	James C. Blanchard	Sinclairville.
West Ellery	W. L. Barnes	Bemus Point.
CHENANGO COUNTY.		
Blanding	Wm. L. Blanding	Sherburne.
Church	D. C. Church	Afton.
Fly Creek	Barber & Miner	Oxford.
Lobdell	Edward F. Smith	Beaver Meadow.
Lyon Brook	E. L. Haynes	Oxford.
Marcy	L. A. Gross	Greene.
Peck, R. B.	R. B. Peck	South New Berlin.
Preston	Charles H. Southard	Preston.
Plymouth	Geo. P. Cushman	Plymouth.
Smyrna Hill	David Campbell	Smyrna.
South Plymouth	C. M. Dickerson	South Plymouth.
Trout Brook	Curtis Kenyon	Mariposa.
Tuttle	E. L. Bowe	Greene.
CLINTON COUNTY.		
Peru	A. D. Boomhower	Plattsburgh.
CORTLAND COUNTY.		
Atkinson	Geo. K. Atkinson	Truxton.
Carson	C. E. Carson	Marathon.
Cortland County Central	Davis & Rowe	McGrawville.
Farmers	Omer Andrews	Little York.
Homer West Hill	Chauncey Garner	Homer.
Jones	Clinton U. Tibbets	Truxton.
Marathon Milk Depot.	Henry F. Huntemann	Marathon.

CORTLAND COUNTY — (Concluded).

NAME OF FACTORY.	Applicant.	Post-office.
Martin, A.	Alden Martin	East Freetown.
Meachan	J. W. Hallock	Marathon.
Milk Producers' Union	W. E. Russell	Blodgett Mills.
North Solon	C. W. Ellis	McGrawville.
Sears	Frank H. Sears	Cortland.
Summer Hill Creamery	A. W. Ranney	Cortland.
Trout Brook	Chas. F. Davenport	McGrawville.
Wightmans	Homer Wightman	Marathon.
DELAWARE COUNTY.		
Strattons Falls	R. S. Smith	Roxbury.
Riverside	A. G. Sergent	Sidney.
ERIE COUNTY.		
Beaver Meadow	Clair Bros.	Springville.
Bennington Center	Richardson, Beebe & Co.	East Aurora.
Bigelow	Clair Bros.	Springville.
Block	Clair Bros.	Springville.
Boston	Clair Bros.	Springville.
Canada Hills	Clair Bros.	Springville.
Colden Center	Richardson, Beebe & Co.	East Aurora.
Crossman	Clair Bros.	Springville.
Dye	Clair Bros.	Springville.
East Aurora	Richardson, Beebe & Co.	East Aurora.

East Concord	Clair Bros	Springville.
East Holland	Richardson, Beebe & Co.	East Aurora.
Ellicottville	Clair Bros	Springville.
Elmont	Richardson, Beebe & Co.	East Aurora.
Erie	Richardson, Beebe & Co.	East Aurora.
Fox	Clair Bros	Springville.
Franktown	Clair Bros	Springville.
Frye	Clair Bros	Springville.
Glenwood	Clair Bros	Springville.
Henshaw	Clair Bros	Springville.
Holland	Richardson, Beebe & Co.	East Aurora.
Hunters Creek	Richardson, Beebe & Co.	East Aurora.
Java Center	Richardson, Beebe & Co.	East Aurora.
Java Village	Richardson, Beebe & Co.	East Aurora.
Marilla	Richardson, Beebe & Co.	East Aurora.
North Colden	Richardson, Beebe & Co.	East Aurora.
North Sheldon	Richardson, Beebe & Co.	East Aurora.
Porterville	Richardson, Beebe & Co.	East Aurora.
Prathan	K. C. Spence	East Aurora.
Protection	Richardson, Beebe & Co.	East Aurora.
Pullman	Clair Bros	Springfield.
Queen of the Valley	Richardson, Beebe & Co.	East Aurora.
Richmond	Clair Bros	Springfield.
Sheldon	Richardson, Beebe & Co.	East Aurora.
Smith	Clair Bros	Springfield.
Somerville	Clair Bros	Springfield.
South Colden	Richardson, Beebe & Co.	East Aurora.
South Sheldon	Richardson, Beebe & Co.	East Aurora.
Springville	Clair Bros	Springfield.

ERIE COUNTY — (Concluded).

NAME OF FACTORY.	Applicant.	Post-office.
Strikersville.....	Richardson, Beebe & Co.....	East Aurora.
Townsend Hill.....	Clair Bros.....	Springville.
Toziers.....	Richardson, Beebe & Co.....	East Aurora.
Vinton.....	Clair Bros.....	Springville.
Wales.....	Richardson, Beebe & Co.....	East Aurora.
Wales Centre.....	Richardson, Beebe & Co.....	East Aurora.
West Machias.....	Clair Bros.....	Springville.
West Valley.....	Clair Bros.....	Springville.
Willink.....	Richardson, Beebe & Co.....	East Aurora.
FULTON COUNTY.		
Cross Road.....	Elmer J. Dorn.....	Johnstown.
Ephratah.....	W. J. Getman.....	Ephratah.
Pine Grove.....	O. Sanderson.....	Emmonsburgh.
GENESEE COUNTY.		
Alexander.....	Sanford Riddle.....	Alexander.
Byron.....	H. C. Norton.....	Byron.
HERKIMER COUNTY.		
Ash Creek.....	T. E. Curtis.....	Ohio.
Baker Home.....	J. C. Morgan.....	Mohawk.
Bastow Hill.....	James W. Ford.....	Fairfield.

Big Spring.....	W. McKerron.....	Middleville.
Brighton.....	J. C. Morgan.....	Mohawk.
Browns, B. K.....	B. K. Brown.....	Newport.
Cedarville.....	L. C. Smith.....	Herkimer.
Clover Valley.....	C. A. Ford.....	Little Falls.
Cold Brook.....	B. K. Brown.....	Newport.
Countryman.....	M. Getman.....	Mohawk.
Craines Corners.....	T. C. Swift.....	Jordanville.
Cranes, Edward.....	Edward Cranes.....	Salisbury.
Cullen.....	Charles Garline.....	Cullen.
Davis, Geo. H.....	Geo. H. Davis.....	Frankfort.
Denisons Corners.....	M. Getman.....	Mohawk.
East Schuyler.....	S. P. Lints, Jr.....	East Schuyler.
Eggleston No. 1.....	O. E. Eggleston.....	West Winfield.
Eggleston No. 3.....	O. E. Eggleston.....	West Winfield.
Eggleston No. 10.....	O. E. Eggleston.....	West Winfield.
Eggleston No. 11.....	O. E. Eggleston.....	West Winfield.
Eggleston No. 13.....	O. E. Eggleston.....	West Winfield.
Eggleston & McLoughlin.....	O. E. Eggleston.....	West Winfield.
Elizabethtown.....	L. C. Smith.....	Herkimer.
Fairfield Centennial.....	Alexander McKerron.....	Middleville.
Fairfield Centennial Branch.....	G. Veitch.....	Middleville.
Fay.....	J. C. Morgan.....	Mohawk.
Fenner.....	Charles Pound.....	Fairfield.
Frankfort.....	J. C. Morgan.....	Mohawk.
Fulmer Creek.....	O. B. Christman.....	Mohawk.
Galusha, S. J.....	Samuel J. Galusha.....	Starkville.
Getman, M.....	M. Getman.....	Mohawk.
Gilt Edge.....	C. W. Davis.....	Frankfort.
Gray.....	A. E. Snyder.....	Gray.

HERKIMER COUNTY — (Concluded).

NAME OF FACTORY.	Applicant.	Post-office.
Gulph	James Donahue.....	Gulph.
Henderson Association.....	T. C. Swift.....	Jordanville.
Herkimer.....	Peter Miller.....	Herkimer.
Hider.....	J. C. Morgan.....	Mohawk.
Hinckley, G.....	E. H. Hughes.....	Gravesville.
Jordanville.....	M. Getman.....	Mohawk.
Kast Bridge.....	Alvin Countryman.....	Herkimer.
Knapp, Wheeler.....	Isaac Fox.....	Dolgeville.
Lanning.....	W. B. Lanning.....	Russia.
La Rue.....	L. A. La Rue.....	Little Falls.
Little Falls.....	Hiram Broat.....	Little Falls.
Lyon, J. H.....	J. H. Lyon.....	Cold Brook.
Maple Grove.....	Berton Walts.....	Van Hornsville.
Middleville.....	A. W. Ford.....	Middleville.
Moore, Miles.....	Miles Moore.....	Russia.
Morgan, J. C.....	J. C. Morgan.....	Mohawk.
New Manheim.....	John Garlock.....	Little Falls.
Newville Association.....	S. G. Spoor.....	Newville.
No. 2.....	O. E. Eggleston.....	West Winfield.
North Litchfield.....	H. H. Davis.....	North Litchfield.
North Schuyler.....	C. G. Babcock.....	Newport.
North Winfield Combination No. 1.....	C. T. Wheelock.....	West Winfield.
North Winfield Combination No. 2.....	C. T. Wheelock.....	West Winfield.
North Winfield Combination No. 4.....	C. T. Wheelock.....	West Winfield.
North Winfield Combination No. 5.....	O. T. Wheelock.....	West Winfield.

North Winfield Combination, No. 6			
Norway	C. T. Wheelock	West Winfield.	
Old Fairfield	H. C. Nichols	Norway.	
Old Manheim	E. C. Rice	Fairfield.	
Old Salisbury	Joseph Rice	Little Falls.	
Paine's Hollow	Alfred Vannais	Salisbury.	
Poland	George H. Van Slyke	Edick.	
Rising Star	John B. Read	Poland.	
Schuyler's Centennial	A. B. Davis	Paine's Hollow.	
Shell's Bush	W. V. Minott	East Schuyler.	
Small Bush	James A. Krum	Eatonville.	
South Columbia	Adam Carter	Little Falls.	
Star	M. Getman	Mohawk.	
Sterling Creek	H. A. Skinner	Little Falls.	
Waddell & Eggleston	C. G. Babcock	Newport.	
West Winfield Creamery	O. E. Eggleston	West Winfield.	
Wetmore, C. W.	Christopher Vagts	West Winfield.	
White Creek	C. W. Wetmore	Frankfort.	
	John Baird	Newport.	
JEFFERSON COUNTY.			
Allen, H. J.	H. J. Allen	Adams.	
Belleville	Ingraham, Overton & Co	Belleville.	
Bullock	C. D. Hitchcock	Worthville.	
Central	Marion Hall	Wilna.	
Clover Dale	Alanson E. Gove	Pamelia Four Corn'rs	
Cold Brook	L. E. Walts	Omar.	
Cold Spring	C. A. Overacker	Redwood.	
Collins' Landing	Walter Collins	Omar.	
Cooper, I. C.	I. C. Cooper	Theresa.	
Cooper, I. C.	I. C. Cooper	Theresa.	

JEFFERSON COUNTY — (Concluded).

NAME OF FACTORY.	Applicant.	Post-office.
Cooper, I. C.	I. C. Cooper.	Theresa.
Devois Corners.	Zurriel Sarvay.	Carthage.
Douglass	J. P. Douglass.	Theresa.
East Rodman.	F. P. Denaway.	East Rodman.
Farners	Fred. V. Hass.	Depauville.
Fillmore Bros.	H. H. Fillmore.	Woodville.
Fox, G. A.	M. H. Fox.	Lorraine.
Gould	Gould & Bacon.	Pamela Four Corn'rs
Hadsall & Moore.	A. W. Hadsall.	Black River.
Henderson	Benj. Worthingham.	Henderson.
Hillside	C. O'Brien.	Theresa.
Hill Spring	C. H. Grapatte.	Omar.
Howard	David H. Schell.	Stone Mills.
Jersey	C. M. Lowe.	Philadelphia.
Kings	F. Kings.	Ellisburgh.
Lake View	W. A. Ebbie.	Sackett's Harbor.
Line Road	R. P. Grant.	Clayton.
Lorraine Village.	W. R. Gow & Co.	Lorraine.
Maple Grove.	A. M. Brown.	Lorraine.
Mather Bros.	Simeon Mather.	Belleville.
Muzzy.	F. M. & J. B. Muzzy.	Smithville.
North Adams	E. D. Holloway.	Adams Centre.
North Rodman.	J. Sterling Sill.	Rodman.
O. K.	Olmstead & Knapp.	Great Bend.

Ontario	Pardon N. Pettengill.....	Henderson.
Orleans Four Corners	G. C. Timmerman	Orleans Four Corners
Pamela	E. B. Nichols	Watertown.
Parkinson, P. C.	P. C. Parkinson	Watertown.
Perry	Levi S. Perry	Limerick.
Philadelphia	W. S. Kyes	Philadelphia.
Pitkin	L. S. Pitkin	Lorraine.
Riverside	J. P. Carpenter	Oxbow.
Rock Spring	L. B. Martin	Pierrepont Manor.
Rodman Village	M. G. Wilson	Rodman.
Shakersville	A. D. Boyd	Tremain's Corners.
Smith, A. J., No. 1.	Anson J. Smith	Mannsville.
Smith, A. J., No. 2.	Anson J. Smith	Mannsville.
Smithville	D. B. York	Smithville.
South Champion	D. A. Goodrich	South Champion.
Spring	George Flath, Jr.	Philadelphia.
Spring Brook	Charles D. Chase	Natural Bridge.
Stone, E. L., No. 1.	E. L. Stone	Mannsville.
Stone, E. L., No. 2.	E. L. Stone	Mannsville.
Stone, E. L., No. 3.	E. L. Stone	Mannsville.
Stone, E. L., No. 4.	E. L. Stone	Mannsville.
Tylerville	B. Dickinson	South Rutland.
Wardwell	F. M. Matterson	Pierrepont Manor.
Warren Settlement	Lewis Cornair	Rosiere.
West Fowler	Bradford Sterling	Antwerp.
West Rodman	W. P. Green	Adams Center.
Williams, E. J., No. 2.	J. L. Williams	Rutland.
Woodville	George M. Wood	Woodville.
Thousand Island	S. W. Cousard	Clayton.

LEWIS COUNTY.

NAME OF FACTORY.	Applicant.	Post-office.
Alger, Geo. S.	George S. Alger.	Martinsburgh.
Beach Hill	J. Merz.	New Bremen.
Brookside	W. A. Wheeler.	Billwood.
Carroll	Wm. Finn.	Pinckney.
Champion Spring.	Christian Hirschey.	Beaver Falls.
Chrestien, F. M.	F. M. Chrestien.	Osceola.
Clover Valley	W. S. Benton.	New Bremen.
Cold Spring	Chandler E. Merz.	Croghan.
Collinsville	James Roberts.	Collinsville.
Copenhagen.	Frank J. Stockwell.	Copenhagen.
Dairy Hill	David Miller.	Constableville.
Denmark	A. & H. E. Cook.	Denmark.
Eagle	E. G. Graves.	Lowville.
East Watertown	John G. Parker.	East Watertown.
Farmers' Choice.	W. E. Gaynor.	New Bremen.
Fish Creek	Henry G. Dois.	Constableville.
Forks	J. E. Murphy.	Montague.
Gardner's Corners.	C. F. Niebergall.	Gardner's Corners.
Glendale	Rudolph Regez.	Glendale.
Gowdy	F. C. Gowdy.	W. Martinsburgh.
Grass Valley	W. D. Lewis.	Turin.
Haller	Willis Haller.	Beaver Falls.
Hillside	W. S. Benton.	Martinsburgh.
Houseville.	J. H. Smith.	Houseville.

Imperial.....	W. W. Vorce.....	Copenhagen.
Katsmeyer.....	Andrew Katsmeyer.....	West Leyden.
Lowville.....	Jessie F. Bowen.....	Lowville.
Millers.....	Stephen T. Miller.....	Constableville.
Mohawk Hill.....	M. B. Farrell.....	Constableville.
Moose Creek.....	W. J. Mellon.....	Leyden.
Mullen.....	C. A. Higby.....	Constableville.
New Boston.....	Thos. W. McGrath.....	New Boston.
New Model.....	Lewis I. Raynor.....	Copenhagen.
Perkins, G. A.....	G. A. Perkins.....	Turin.
Petrie.....	Henry Petrie.....	Turin.
Plummer.....	George Plummer.....	Constableville.
Rising Star.....	Clinton A. Fox.....	Copenhagen.
Riverdale.....	A. W. Van Arnum.....	Glendale.
River Street.....	Mrs. F. W. Knowlton.....	Copenhagen.
Rawson Springs.....	Charles M. Henry.....	W. Martinsburgh.
Sharp.....	C. W. Shaffer.....	Lowville.
Sins & Bierly.....	Joseph Sins, Sr.....	West Leyden.
Spring Brook.....	M. L. Hoffman.....	Greig.
Star.....	Haller & Bickelhaupt.....	Harrisburgh.
Staring.....	Wm. H. Ingersoll.....	Houseville.
Sulphur Springs.....	J. H. Searl.....	Lowville.
Swiss Creek.....	Otis A. Loomis.....	Warrensburgh.
Union.....	J. C. Hardy.....	Barnes' Corners.
Union of Croghan.....	Frank Malady.....	Carthage.
Union Spring.....	G. E. Roberts.....	Castorland.
West Leyden.....	Michael Earnst.....	West Leyden.
Williams, E. J.....	John Fox.....	Copenhagen.
Williams, E. J., No. 3.....	E. J. Williams.....	Barnes' Corners.

LIVINGSTON COUNTY.

NAME OF FACTORY.	Applicant	Post-office.
Dalton	Mrs. J. B. Wheeler	Dalton.
MADISON COUNTY.		
Baldwin, A. B.	Perry F. Babcock	Brookfield.
Beaver Creek	William W. Clark	Brookfield.
Big Spring	Charles E. Lovejoy	Madison.
Bridgeport	John Durst	Bridgeport.
Cole	Charles Fairchild	Peterboro.
Crystal Springs	O. J. Tucker	Mile Strip.
East Boston	A. W. Prescott	East Boston.
East McDonough	F. Blanding	Hubbardsville.
Excelsior	Mrs. S. R. Hill	Chittenango.
Excelsior	U. N. Holmes	Brookfield.
Flats	E. L. Beebe	Nelson.
Harris	Edgar Harris	Brookfield.
Hill Spring	Paul S. Main	Perryville.
Hollenbeck	R. J. Hollenbeck	Peterboro.
Hubbardsville	F. Blanding	Hubbardsville.
Ladd, Dan	Dan Ladd	Canastota.
Lake View	H. M. Stafford	Perryville.
LaMunion & Clark	La Munion & Clark	Munsville.
Lenox Mills	S. A. Buyea	Hobokenville.
Marsh	U. N. Holmes	Brookfield.
Mott	G. M. Rainey	Leonardsville.

Osgood	G. N. Stone	Chittenango.
Paramount	John P. Davis	Nelson.
Peterboro	William E. Davis	Peterboro.
Pine Woods	C. Townsend	Pine Woods.
Pleasant Brook	W. G. Hatch	Lebanon.
Pleasant Valley	Levi Miller, Jr.	Peterboro.
Pratts Hollow	L. S. Lindsley	Pratts Hollow.
Quaker Basin	J. Baldwin	De Ruyter.
Reservoir	S. D. Burdick	De Ruyter.
Sheds Corners	Alexander Harris	Sheds Corners.
Siloam	A. E. Miller	Siloam.
Solsville	A. N. Peckham	Solsville.
Stockbridge	Isaac L. Clemens	Stockbridge.
Stockbridge Star	L. C. Hinman	Valley Mills.
Temple	I. A. Wager	North Brookfield.
Two Elms	O. R. Cole	Solsville.
Union	U. N. Holmes	Brookfield.
Valley Mills	Clinton Adams	Valley Mills.
Williams Corners	W. G. Hatch	Lebanon.

MONTGOMERY COUNTY.

Ames, C. F.	A. B. Miller	Ames.
Brookmans Corners	M. A. Peckard	Fort Plain.
Christman, G. H.	G. H. Christman	St. Johnsville.
East Creek	H. D. Ellison	Montgomery.
Fairview	Hamilton Snell	St. Johnsville.
Fort Willett	M. E. Timmerman	Fort Plain.
Minaville	Hiram Schuyler	Minaville.
Spraker	Gustave Bushholtz	Palatine Bridge.

MONTGOMERY COUNTY — (Concluded).

NAME OF FACTORY.	Applicant.	Post-office.
Smith, A. & Co.....	Fayette B. Smith	St. Johnsville.
Smith Creek	J. Harvey Smith	Fort Plain.
Waterville	Dayton R. Mallette	Ames.
ONEIDA COUNTY.		
A. P. L., Bennetts Corners	Mrs. A. P. La Munion	Bennetts Corners.
Augusta Valley	James D. Nelligar	Vernon Centre.
Augusta Valley	J. W. Skerritt	Augusta.
Bartlett	Storey Bros	Westmoreland.
Blossvale	John Halstead	Blossvale.
Blue Brook	Roseoe C. Coon	Ava.
Brodock	Andress Brodock	Plains.
Castle, G	Henry C. Morehouse	Ava.
Chard	Robert Chard	Washington Mills.
Chickery	T. F. Jones	Clinton.
Chrestien, A.	Greene Johnson	Florence.
Clarks, F.	Henry E. Blanchard	Vernon.
Cloverdale	James D. Kelly	Deansville.
Gold Spring	David R. Griffith	Remsen.
Cornish	A. Cornish	Camden.
Cream	J. F. Burleigh	Vernon.
Delta	J. Macomber	Delta.
Donser	J. J. Donser	Boonville.
Doxtater	W. H. Humpage	Higginsville.
East Creek	H. D. Ellison	Utica.

Elmwood	W. E. Golley	Boonville.
Farmers	E. D. Franklin	Lelia.
F. F.	S. H. Austin	Northwestern.
Fitch & Bacon	Hiram H. Bacon	Verona.
Floyds Corners	Edwin E. McFarland	Floyds Corners.
Floyd Hill	Albert Carroll	Holland Patent.
French Road	H. J. Fitch	East Steuben.
Greggains	William Greggains	Glenmore.
Hatches Corners	Charles L. Clemons	Greenway.
Hecla	A. J. Pine	Vernon.
Hecla	Thomas J. Olney	Hecla.
Hillsborough	Ford & Wilson	Camden.
Hurlbet	James W. Harris	Ava.
Jackson Valley	D. Karlan	Boonville.
Kelley Tract	Stephen S. Stuber	Holland Patent.
Kellogg	E. H. Kingsbury	Sangerfield.
Kent, B. H.	Bion H. Kent	East Steuben.
Lee Centre	H. M. Parker	Lee Center.
Lee Corners	Jacob Davis	Stokes.
Lowell	G. A. Hunter	Lowell.
Maple Grove	Arch. M. Blue	North Gage.
Marcy Centre	George R. Wright	Marcy.
McFarland, E. E., No. 2	E. E. McFarland	Floyd.
Meadow Brook	Uriah Fitch	Boonville.
Merry, G.	G. Merry	Verona.
Merry, J. F.	J. F. Merry	Verona.
Millers Branch	John Miller	East Florence.
Mitchells Union	J. Edgar Mitchell	Rensen.
Mud Lake	J. J. Donser	Boonville.
Mullin Hill	Robert Roberts	Delta.

ONEIDA COUNTY — (Concluded).

NAME OF FACTORY.	Applicant.	Post-office.
Newell, L. E.	L. E. Newell	Colemans.
New London.	J. J. Seim.	New London.
North Bay.	Nicholas Van Horne	North Bay.
North Gage.	P. Welch.	North Gage.
North Steuben.	N. H. Folts.	North Western.
North Trenton.	R. E. Jones.	Remsen.
Oneida Valley.	Adelbert Burton.	Oneida Valley.
Point Rock.	C. H. Walters.	Point Rock.
Porter.	C. W. Porter.	North Western.
Prospect.	John E. Edward.	Prospect.
Quaker Hill.	John McCurn.	West Branch.
Rathbuns.	Charles Rathbun.	Verona Mills.
Rathbunville.	L. B. Martin.	Verona Mills.
Reardon, Patrick J.	John F. Hennessy.	East Florence.
Remsen.	John O. Thomas.	Remsen.
Ridge.	Robert McAdam.	Rome.
River Road.	George G. Prescott.	Maynard.
Rock Maple Grove.	J. H. Wollaber.	North Western.
Rock Spring.	Mrs. E. S. Davies.	Ava.
Saulpaughs.	Chas. H. Saulpaugh.	Rome.
Sheans Bros.	Charles Bathrick.	Glenmore.
Slys.	E. R. Sly.	West Camden.
Southwestern.	Charles D. Parsell.	Big Brook.
Star Hill.	Cicero Williams.	Remsen.
Steuben Association.	J. D. Merrick.	Steuben.

Steuben Centre.....	Herbert A. Johnson.....	Steuben.
Storey.....	Storey Bros.....	Westmoreland.
Taberg.....	Geo. J. Haas.....	Taberg.
Teals.....	A. B. Teal.....	Westmoreland.
Thomas, G. D.....	G. D. Thomas.....	Camroden.
Thomas, R. E.....	Daniel Jones.....	Alden Creek.
Trenton.....	William H. Comstock.....	Trenton.
Tuthill, D. H.....	D. H. Tuthill.....	Camden.
Union.....	H. P. Davies.....	Ava.
Union.....	Sam Wittwer.....	Oriskany.
Union.....	John C. Owens.....	Trenton.
Vernon & Verona.....	S. J. Burleigh.....	Vernon.
Verona Landing.....	H. M. Carpenter.....	Higginsville.
Vienna.....	I. Blasier.....	Vienna.
Walesville.....	Thomas Prescott.....	Walesville.
Walsworth.....	Gardner Haynes.....	Delta.
Walters, C. H.....	C. H. Walters.....	Point Rock.
Waterbury, C. F.....	Mrs. C. F. Waterbury.....	Florence.
Westernville.....	M. H. Merrick.....	Westernville.
West Vienna.....	A. B. Cagwin.....	West Vienna.
Willow Grove.....	Daniel V. Fuller.....	Trenton.
Willow Valley.....	John Burrows.....	Alden Creek.
Yager, J. J.....	J. J. Yager.....	Rensen.
ONONDAGA COUNTY.		
Barnaskey.....	G. W. Barnaskey.....	Lysander.
Block.....	E. M. Sharp.....	Fabius.
Brewerton.....	Brewerton Butter and Cheese Company.....	Brewerton.
Clay Centre.....	Frank Burlis.....	Enclid.
Cuyler.....	M. S. Allen.....	Delphi.

ONONDAGA COUNTY — (Concluded).

NAME OF FACTORY.	Applicant.	Post-office.
Delphi.....	M. S. Allen	Delphi.
East Fabius.....	M. S. Allen	Delphi.
Grange.....	H. W. Barlow	North Syracuse.
North Manlius.....	D. B. Overhiser.....	North Manlius.
Pompey Centre.....	Moore, Southard & Co	Pompey Centre.
Pompey Hollow.....	Charles Hunt.....	Delphi.
The Cato.....	E. F. Ogilbee.....	Jordon.
Union.....	H. C. Dutton	Delphi.
OSWEGO COUNTY.		
Albion Centre.....	Henry Thorp.....	Sand Bank.
Amboy Centre.....	Robert Foils.....	Amboy Centre.
Battle Island.....	Charles L. Porter	North Scriba.
Black Creek.....	A. Whittemore	Lansing.
Bowen Corners.....	G. D. Trimble.....	Palermo.
Carleton.....	H. M. Carleton.....	Sand Bank.
Castor.....	George L. Castor.....	Pulaski.
Central Square.....	H. E. Beebe	Central Square.
Colosse Union.....	Mrs. Nettie Peach.....	Colosse.
Connors, Peter.....	Charles R. Haggerty	East Palermo.
Demster.....	Willard E. Gilson.....	Demster.
Deweys.....	C. A. Bartell.....	Mexico.
Donellys.....	James W. Dexter.....	Lycoming.
Druse Brothers.....	J. R. Church	North Volney.
Dugway.....	James Doney.....	Dugway.

Eagle	A. H. Snell	Mexico.
East Scriba	H. A. Middleton	Scriba.
Farmers	Ira L. Hosford	Mexico.
Finster, J. E.	I. E. Finster	Lacona.
Gilbert Mills	C. F. Barnaskey	Pennellville.
Granby Centre	W. E. Cussack	Granby.
Hadley	Gilford L. Hadley	Sandy Creek.
Hannibal	E. B. Tucker	Hannibal.
Hess	Philip Hess	West Amboy.
Hinmansville	C. H. Burlis	Hinmansville.
Le Clair	F. P. Le Clair	Lacona.
Little Valley	Meritt Jayner	Greenboro.
Loomis	Wayland W. Loomis	Ingalls Crossing.
May Flower	Horatio E. Potter	West Munro.
May Flower	Andrew Ott	Redfield.
Maple Hill	S. James Hadley	Sandy Creek.
McKinney	A. C. McKinney	Orwell.
Mill Brook	A. S. Hinkle	North Hannibal.
Molino	James Kirkland	Orwell.
Mount Pleasant	Isaac Hale	Mt. Pleasant.
Mowry	E. E. Mowry	Daysville.
New Haven	R. H. Baker	Mexico.
North Constantia	O. W. Harrington	North Constantia.
North Road	F. H. Backus	Scriba.
North Williamstown	D. E. West	Richard.
Olmstead, A. E.	A. E. Olmstead	Orwell.
Oneida River	F. W. Church	Caughdenoy.
Palermo	G. D. Trimble	Palermo.
Parish Centre	R. H. Stevenson	Parish.

OSWEGO COUNTY — (*Concluded*).

NAME OF FACTORY.	Applicant.	Post-office.
Parish Cheese Co.	W. H. Baker.	Parish.
Pennellville	C. F. Barnaskey	Pennellville.
Phoenix	A. P. Merriam	Phoenix.
Pulaski	W. C. Holmes	Pulaski.
Salisbury	Brayton Salisbury	Pulaski.
Salisbury No. 2	Brayton Salisbury	Palermo.
South Granby	G. D. Trimble	Palermo.
South Hannibal	G. D. Trimble	Palermo.
South Richland	J. J. Miller	South Richland.
Star	F. N. Chrestien	Oscoda.
Stone Quarry	John Piper	Arthur.
Stillwater	DeForest Hunt	Orwell.
Stevens	Allen M. Stevens	Orwell.
Union	P. Davis	Mexico.
Union Square	John F. Harten	Union Square.
West Eaton	Edgar Hamilton	Mexico.
West Monroe Star	Will Mutter	West Monroe.
Wilcox	M. C. Wilcox	Oswego Falls.
Williamstown	H. J. Oram	Williamstown.
Woods, G. A.	E. E. Mowry	Daysville.

OTSEGO COUNTY.

Brockway, H. C., No. 1	H. C. Brockway	Richfield.
Bushnells	Gilbert & Root	Gilbertsville.
Casler, XXX, No. 2	M. D. Casler	Garrattsville.

Chaseville	Peter Bush	Chaseville.
Coldbrook	J. C. Stillman... .	West Edmeston.
German	August Aufmuth..	Fly Creek.
Gregory, S. C.....	Gilbert & Root..	Gilbertsville.
Hartwick Seminary	Gilbert & Root..	Gilbertsville.
Hinman Hollow	Gilbert & Root..	Gilbertsville.
Holdredge	A. Holdredge	West Burlington.
Kinney	J. P. Kinney	Snowden.
Lams, E. D.	E. D. Lams.....	Unadilla Forks.
Laurens.....	Gilbert & Root..	Gilbertsville.
Lloydsville.....	K. J. Wings.....	Unadilla Forks.
Maryland	Gilbert & Root..	Gilbertsville.
Masons	Gilbert & Root..	Gilbertsville.
Milford Center	L. W. Seger.....	Portlandville.
Noblesville.....	Gilbert & Root..	Gilbertsville.
Palmer	Peter Bush	Chaseville.
Park	George M. Ackerman.	Burlington.
Patten.....	Fred B. Rainey ..	Burlington.
Ricetown	L. A. Chase	Lentsville.
Richardson Hill	Peter Bush	Chaseville.
Roots	Gilbert & Root..	Gilbertsville.
South Hartwick	Gilbert & Root..	Gilbertsville.
Sponseberg	W. H. Sponseberg.	Fly Creek.
Westford	C. E. McRosie.....	Westford.
Wileytown	L. P. Young.....	Oaksville.
Young, Fred L.....	Fred L. Young.....	Oaksville.

RENSSELAER COUNTY.

North Petersburg

C. F. Bullock.....

N. Petersburg.

ST. LAWRENCE COUNTY.

NAME OF FACTORY.	Applicant.	Post-office.
Belleville	E. A. Sheffner	Edwards.
Brees	Hall & Kinney	Gouverneur.
Centennial	Samuel Erwin	Lisbon.
Cheshire	Fred W. Greene	De Kalb Junction.
Cow Path	McGee J. Johnson	De Kalb Junction.
Dickson	Hodgkins & Dickson	Spragueville.
Dupontville	W. F. Dollinger	Rossie.
East Pierrepont	F. P. McCarthy	Hannawa Falls.
Edwards Village	G. L. Bartlett	Edwards.
Elmdale	C. E. Griffin	Elmdale.
Elm Grove	Picard & Baker	Heron.
Fine Village	Herbert M. Ames	Fine.
Hodgkin	Hodgkin & Berry	Spragueville.
Jenny Creek	M. J. Brainard	Pitcairn.
Jerusalem	John Lincoln & Son	Canton.
Maple Grove	Charles A. Moore	Potsdam.
Marshville	T. C. Loucks	Heron.
New York State No. 33	Dalton Bros	Gouverneur.
Porter Hill	J. H. Foster	Heron.
River Road	H. W. Overacker	Richville.
Scotch Settlement	C. J. Shoulette	Rossie.
Settlement	W. E. Brainerd	Canton.
Somerville	James W. Marshall	Somerville.
South Potsdam	B. F. Leonard	Potsdam.

Sprague	F. W. Sprague	Hailesboro.
Thousand Islands	Daniel F. Babcock	Chippewa Bay.
West Hermon	J. B. Newell	Hermon.
West Russell	Rollin F. Smith	Russell.

SCHENECTADY COUNTY.

Princetown Dairy Association	S. W. Quick	Rynex Corners.
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STEBEN COUNTY.

Bennett's Creek	Enos Smith	Bennett's Creek.
Call Hill	D. A. Oakes	Purdy Creek.
Doulin	J. W. Bennett	Howard.
Greenwood	George M. Stephens	Greenwood.
Greenwood Village	O. D. Stephens	Greenwood.
Neil's Creek	I. F. Barnes	Neil's Creek.
Rexville	T. A. McCormick	Rexville.
Snyder Combination No. 3	O. H. Snyder	Troupsburgh.
Stephens	O. D. Stephens	Greenwood.
Troupsburgh	James McKinley	Troupsburgh.
West Union	Barney & Updyke	West Union.
Wileysville	W. H. Scoville	Wileysville.

TOMPKINS COUNTY.

Lafayette	John H. Kilbourn	McLean.
McLean	Frank E. Perry	McLean.

WASHINGTON COUNTY.

Salem	James M. Thompson	Salem.
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WAYNE COUNTY.

NAME OF FACTORY.	Applicant.	Post-office.
Red Creek.....	George Rose	Red Creek
WYOMING COUNTY.		
Bliss.....	J. O. Milks.....	Bliss.
Campbell Hill	Edward Wolcott.....	Pike.
East Koy.....	Charles H. Bavier.....	East Koy.
Empire.....	A. M. Thompson	Lamont.
Excelsior	L. F. Uttley.....	Bliss.
Gainesville	A. L. Fuller.....	Gainesville.
Greene, C. A.....	C. A. Greene	Warsaw.
Griffiths Corners	A. L. Fuller.....	Gainesville.
Hermitage.....	Peter P. Glor	Hermitage.
Oatka	E. N. Wiseman	Gainesville.
Sandusky No. 7	E. C. Welles.....	Arcade.
Sandusky No. 8	E. C. Welles.....	Arcade.
Silver Spring.....	N. Lamberson	Silver Springs.
South Eagle	Albert B. Wright	Pike.
Star No. 1.....	T. J. Hubbard	Wethersfield.
Star No. 2	T. J. Hubbard	Wethersfield.
Star No. 3	T. J. Hubbard	Arcade.
Stearns.....	W. E. Stearns	Bliss.
Wing St.....	E. O. Wood	

Heretofore we have set forth at some length in our reports our views as to handling and caring for milk, and as to the best methods of manufacturing into butter, in order that the product might be of the best quality. We have also spoken at some length with reference to the care and feeding of the cow, and with reference to the further manipulation of the farm and dairy, in order that the aggregate result might be a success.

In view of the fact that we have done this in other reports, we concluded not to repeat the same this year, but to write to a number of prominent dairymen whose operations were known to be wholly or in the main successful, asking them to give us a detailed statement of their methods for the purpose of publication. We did this with the view of setting forth the statements in this report for the benefit of those who may not be as successful in some or all of the details of dairying as these men are acknowledged to be. With that point in view, we addressed the following communication to a number of dairymen whose success has been such as to warrant the statement that they are in the front ranks of dairy farmers:

Dear Sir.—We understand that you are a successful dairyman, as to the quality of the product made, as to the financial returns from the same and as to the keeping of your stock and farm in good condition for future use.

For this reason we take the liberty of addressing this communication to you, indulging in the hope that you will write us giving a review of your methods for the purpose of publication.

We desire to know what kind of cattle you keep; what measures you take to keep your dairy continually good and vigorous; what you feed; how you prepare it; and the manner and times of feeding, watering, etc.

What, if any, precautions you take as to the temperature of the water given to the cattle; how you care for and house your stock; what, if any, absorbents you use to keep your stables free from bad odors; how you handle and care for your milk; in what time and how you take your cream from it; your method of caring for the cream; at what age and temperature you churn it; your method of churning and making into butter; and how you care for and market the same.

By what means, if any, you determine as to whether individual cows are a source of profit or loss. If you are feeding silage, we would be pleased if you would tell us your views with reference to it giving the history of your experience in that line.

If you have any special views with reference to the care and use of fertilizers produced on the farm we would be pleased if you would favor us with them also.

Hoping that we may be favored with a reply from you as soon as November twenty-fifth, and that we may be notified at your earliest convenience as to whether we may depend on you for the desired information, we are,

Very respectfully yours, etc.

We have received the following replies to this communication:

DEPOSIT, N. Y., *November 6, 1891.*

MR. GEORGE L. FLANDERS, *Assistant Dairy Commissioner:*

Dear Sir.—I am in receipt of yours of the second instant, and will answer your questions to the best of my ability.

First. Our dairy is composed of Jerseys and Jersey grades, and we use a full-blooded Jersey bull; the bull is not used more than three or four years before we change. We raise our own cows mostly and find that even then the herd requires constant culling to maintain a dairy of first-class cows. We turn our cows out to graze about May tenth, and feed a small ration of grain until June first, and then do not feed any grain until October first, when we again commence with a small ration. This is the feed for the summer season. About November first we take our cattle into winter quarters, although we stable cold and stormy nights in October.

We feed silage with a grain ration composed of wheat bran, four pounds; oil meal, two pounds; ground rye, two pounds; twice daily. A small ration of hay (clover if we have it) at noon. We have found that if the silage is cut green and full of juice, not water, once daily was sufficient. Our silage this year was more mature, and think the cows will require water twice per day. Our water runs to the barn from a living spring and at about the temperature of fifty. We do not think it would be any benefit to warm it. Our stables are built of wood and we aim to have them warm enough to keep out all frost. We use cut straw or sawdust for bedding cows and as an absorbent; have sometimes used in addition, plaster. These absorbents aid very materially in keeping the stables clean and the air pure. The cows are cleaned with comb and brush daily, which is a material help to keep the milk clean. The cows are milked at 6 o'clock in the morning and the same at night. As fast as the milk is drawn from the cows it is strained into cans outside of the stables and is then taken directly to the dairy at once where it is again strained and

run through a De Laval separator, the skim-milk running into a pipe that leads outside into barrels, which are carried to calf and pig pens. The milk, being warm, can be fed to calves without any trouble of waiting and warming, as is necessary when milk is set to raise the cream. The cream runs directly into tin pails twenty inches by six inches, and these are set as fast as filled, in a tank of spring water, that averages about 50 degrees F. The pails filled in the morning stand in the water until the next morning (twenty-four hours), and those filled at night remain in the tank twelve hours. The whole is then emptied into a large can to ripen, when it remains twenty-four hours at a temperature of eighty, or near that. It is then placed in a barrel-churn and churned at a temperature of about sixty-four in summer and sixty-six to sixty-eight in winter. We churn every day, and in this way can ripen the cream nearly alike, and make a uniform article of butter.

When the butter appears in grains the size of wheat kernels, cold water is thrown into the churn and a few revolutions of the churn made, when the butter is removed to the worker, having been weighed and salted, three-fourths of an ounce to the pound. The ground roller of the butter-worker is started and the salt thoroughly mixed with the butter.

The butter is taken from the worker in a tub and removed to the cooler, if the weather is hot, and, if cold, kept in the dairy-room. After standing a few hours it is again worked a trifle, until all salt streaks have disappeared, and is then made into pound prints, wrapped in butter paper and placed in boxes with trays that hold from forty to seventy pounds. I am aware that this method of working differs from Mr. Gilbert's, the dairy instructor; he only works the butter once, but works it far more than we do with our two workings. I mean to say this was the case when the dairy institute was held at our place. We have customers for the greater share of our butter, although we have some sold by the commission merchants.

To determine whether each individual cow in our dairy is profitable, we weigh the milk the first and fifteenth of each month. We test the milk of each cow separately with the churn, to know just how many pounds of her milk is required for a pound of butter. The least number to make a pound of butter was twelve pounds, and the greatest twenty-three pounds. The average for the year was 18 70-100 to one pound of butter. Great efforts have been made to have dairymen weigh the milk of each cow every day.

Professor Roberts, of Cornell, furnished blanks and offered premiums to those who would do it, but I believe it was a failure. Now, I think, every progressive dairyman might be induced to do

it twice each month if they were satisfied that it would be correct for all practical purposes. The first year we kept the accounts in this way we found that the aggregate of the productions of each individual varied only six pounds from the amount sold; ordinarily it would not figure as close as that, but it is accurate enough for the dairymen to learn what each cow is doing. I will inclose a sample of our method of keeping milk amounts which you can use as you think best. We have a cheap slate for each milker and a name for every cow. The milker hangs his pail on a spring balance and sets the weight down on the slate opposite the name of the cow and when copied into our book the weight of the pail is deducted. In this way you have twice weighing to average the months product from and to those who copy these weights it is interesting to see how uniformly they run.

SAMPLE OF ACCOUNT.

[illegible]

We use no fertilizers on the farm except the manure produced by the cows, horses and hogs on the farm and endeavor to draw this out and spread it as fast as made. I think this answers your questions and shall be glad if it proves of any use in the work in which you are engaged.

I wish to say a few words as to the length of time the cow should go dry or in other words how near the time of calving should the cow be milked. Most of our dairy writers insist that the cows should be all the year round cows and that two or three weeks of rest is sufficient. I have practiced on this plan, but do not do so any more, I am satisfied that the cow will do better, give more milk and make more butter in ten months than she will in twelve. She should have two months rest. I could cite many instances to prove this but will only give one. The best cow in our herd was milked in the year 1890 until nearly time of calving; she failed to make near the amount of butter she did the year before, the amount being 378 pounds. This year she was dried the last of February and came in early in May having had a rest of over two months. The milk was saved for the first time May eleventh, and up to October first had milked five months and twenty days. She has given 5,378 pounds, and as thirteen pounds of her milk makes one pound of butter has made 414 pounds, already beating her record for the whole of last year.

Truly yours,
A. DEVERAUX.

WATERVILLE, N. Y.

Dear Sir.—Dairying upon the Hanover farm was secondary to that of hop-growing, until within a few years past, and probably would have remained so could we have succeeded in keeping up the fertility of the soil and continued to grow large and satisfactory crops without the aid of manure or commercial fertilizers.

It did not need very close observation to show us that there was a gradual exhaustion of the soil going on; that while the books at the end of the year might show an apparent margin of profits for the season's labors, a little reasoning and a few figures clearly demonstrated that there was an invisible loss to the farm of an amount equal to the value of the fertility which had been removed by the various crops sold above that which had been supplied.

The press of the country had much to say about the abandonment of the New England farms necessitated by the neglect of the proper care of the farm, and personal knowledge of like practices in our own State showed that there were hundreds of farmers that were getting nearly ripe enough to gather in. In solving the

problem for ourselves it was an easy matter to find the factors which would show that a continuation of that practice would soon wipe out the plant. The same factors would also demonstrate that to put back upon the farm each year more fertility than was being removed from it would result in a larger production and an increase in the value of the plant. How best to do this was a question of vital importance. We not only wanted to grow larger and better crops, but we wanted to feel sure that at the end of each year we had left the land in better condition in all respects, so that the improvement could be considered permanent. The markets furnished an ample supply of plant food in the form of commercial fertilizers, which we used quite liberally and with fairly good results. Still we were somewhat skeptical about the amount of plant food that was readily available; besides, in using the commercial fertilizers, we were depriving the soil of humus, which we think is very essential, at least in this section of the State.

The expense of buying fertilizers in sufficient quantities to get satisfactory returns calls for a generous outlay of ready money which is not always available. Experiments and experience had often proven that there were more real virtue and lasting qualities in the stable manures for plant food and continual improvement of the farm. How best to make it upon the farm, and at the same time get a profit for manufacturing was a question that took no little study to determine. The pros and cons for various schemes were many, but the incentive to improve the farm was strong, and we decided upon the butter dairy as the means by which we could carry out our pet scheme. The dairy numbered at that time some twelve or fifteen of what I prefer to call common or native cows.

This dairy had not received any particular attention up to that time, and the butter production was probably not much above the average of the cows of the State. As the legitimate work of the dairy was to be butter production, and the by product, for the improvement of the farm, it became necessary to know the cost of the production.

As it was to be piece work, we considered it quite essential to know just what each cow was doing that we might be able to distinguish individual merits or demerits. The introduction of the spring-balance showed that there was a wide range in the individual milk production of the herd, while the creamometer demonstrated that the butter production was equally wide in its range. The breeding of the herd had been such that investigation showed that these wide ranges were family characteristics, and thus inherited tendencies, which had been and could be transmitted with proper care and attention.

The knowledge gained through these investigations showed conclusively the need of thought and close application of business sense in the management of the dairy as well as to that of any other industry, that facts and not fancies were needed, and that each dairyman must gather them for himself.

In connection with the tests for weight of milk and butter production, we also watched the responsiveness of the individual cow to the various foods and rations given.

Here again we found the inherited tendencies of families in the amount of milk given, in the butter production, in laying on of fat capacity for consuming and assimilating food, all of which enter largely into the building of the profitable dairy. By breeding and carefully selecting, we increased the dairy so that last year we had forty-two, eight of which were two year old heifers of our own breeding. The average butter production was 231 pounds which netted twenty-five cents, thus making fifty-seven dollars and seventy-five cents as the receipts per cow for butter sold.

The skimmed milk was fed to calves and pigs and from close estimates we value the year's milk at ten dollar's per cow. This gives a total of sixty-seven dollars and seventy-five cents as the gross receipts per cow. The amount of grain fed averaged seventeen and fifty one-hundredths dollars per cow. We are unable to give the value of the manure. Its good works can be plainly discerned in the increased growth of the crops harvested.

The Babcock test was introduced into the dairy in November, 1890, and notwithstanding the care which had been exercised previous to that time it demonstrated the fact that we had ten cows of the forty-two that were unworthy of being classed among butter producers. The places made vacant by the departure of the ten have been filled by others which were able to stand and prove themselves worthy.

We propose to increase the number and improve the dairy by breeding from our best cows which have the characteristics that we desire transmitted. We have a thoroughbred sire of a butter producing family at the head of the herd, and we are growing eight yearlings and fifteen weanlings of his get which promise well.

We have already indicated that the larger part of our dairy are native cows. We use the word native as we do not like the word scrub when applied to an animal. If that term could be adopted to denote those dairymen who willfully breed, feed and keep forty per cent of the cows of the State it would more nearly signify its true meaning than when applied to the dumb brute made inferior by man's willful ignorance and inhumanity.

Over a half of the dairy are descendants of one family and it demonstrates the fact that there are among the common cows of

the State families or strains which with care, intelligent selection, and judicious feeding can be used as the foundation for strong, vigorous working dairies.

There is far more merit in the common cow under thoroughbred treatment than most dairymen have given her credit for. We seem to forget the fact that the greater portion of all the cheese and butter of this country is made from the native or common cow, despised and scoffed at though she is. Under favorable conditions she can be made to double her present output, given the same encouragement for a few generations and she will closely crowd the average records of some of the finer breeds.

There are thousands of dairymen who are not, and perhaps never will be, able to own thoroughbred stock that can double the present production of the dairy by giving this subject the attention it so justly deserves.

We adopted the system of winter dairying for some of the following reasons: Good fresh made butter is in greater demand in the winter than in the summer and at much higher prices. It is easier to make butter in cold than in warm weather. There is more time to devote to it besides the public demands it and we are desirous of catering to the public taste.

For our winter feeding we provide early cut clover hay which has a slight sprinkling of alsike. Corn ensilage that is well cured and cut when the ears are in the roasting stage. Of the grains we use wheat bran, ground oats and peas, oil meal, cotton-seed meal and sometimes corn meal. We combine or average these feeds so as to meet as nearly as may be the requirements of the individual cows of the herd. The cows are fed three times a day: Ensilage with grain night and morning and hay at noon. The amount of grain fed is governed by the needs and conditions of the cow. The cows are turned out once each day for water and are allowed to stay out only long enough to drink and have the stables cleaned. The water is from a spring some fifteen rods away and by means of a pipe is conducted into a trough in the herding yard. The stables are well lighted and ventilated and the temperature is under the control of the herdsman. Warm stables that can be properly ventilated are very essential to the economical keeping of stock through the winter. The gutters behind the cows are water tight and by the aid of some absorbents in the form of sawdust, dry earth, muck, coal-ashes and gypsum or land plaster we are able to save all the liquids as well as the solids. The gypsum or land plaster is used not only as an absorbent but also as a deodorizer. It takes up and holds all the ammonia and keeps the stable free from all disagreeable odors thus insuring purer air and better health for the stock.

The milk is taken immediately from the stable to the milk-room and set in the cooler creamer for twelve hours in summer and twenty-four in winter under a temperature of forty-two to forty-four degrees. The cream when removed is held at a temperature sufficiently cool to keep it from undergoing any particular change until there is a sufficient amount for a churning, but never longer than thirty-six hours. It is then thoroughly mixed and set in a warmer temperature where it will develop acidity in twenty-four hours. The amount of acidity or the ripening period is determined by the glossy or satiny appearance which develops at the first stage of coagulation. We usually churn at a temperature of sixty-four in winter and sixty-two in summer. It is not possible to give any fixed or arbitrary rules as they must be varied to meet the changed conditions which frequently arise.

It is during these changes that one's judgment must be brought into play to meet them. We use the barrel churn and as soon as separation has taken place and the butter is in small granular form we add a pail of water in which there has been dissolved one or two pounds of salt and at a temperature cool enough to hold the butter in granular form, but not cold enough to injure its working qualities. The brine has a tendency to cut and clean the buttermilk from the butter. After one or two revolutions of the churn the buttermilk is drawn away and the butter thoroughly washed in pure water until there is no semblance of a milky appearance. The butter is then taken from the last water by means of a fine hair sieve spread evenly upon the butter worker and allowed to remain a few minutes to drain. It is then weighed and salted in accordance with instructions from the customers. The salt is put on evenly over the butter by means of the sieve, then carefully stacked or bedded up for a few moments to allow a part of the salt to dissolve and percolate among the granules.

It is then worked only sufficient to expel the moisture and evenly incorporate the salt. For our home trade it is put into pound prints and delivered twice each week. For our New York trade we use the Welsh ash package. It is scoured, and then we line it with parchment paper, thus doing away with any chance for woody flavor. The butter is shipped via express each week. The demand is far greater than the supply. The prices have been remunerative and the business is a paying one. We realize that the age is a progressive one, and we believe that there is a better and more economical way of getting the cream than our present way, and as we do not purpose to be too far in the rear we shall adopt it.

The Babcock test is continually demonstrating that the gravity-system in setting milk, no matter by what or whose plan, fails to

get all the fat, and we feel sure that the loss would warrant a liberal outlay to check the wastage in this direction.

Weighing the milk of each individual cow (though it is done only one day in each week) and using the Babcock test is the only just way we know of for determining her qualities and standing. These tests are within the reach of all, and by doing this the dairyman can tell each day or week just the amount of work each cow is doing; and if he but carefully notes what he is feeding, he will be able to determine whether she is making a profitable response to the various feeds which he is providing. He can also determine as to the proper balancing of the rations. The tester is also a check as to the full creaming of the milk as well as to the churnability of the cream.

By the aid of the tester and balances we get much light relative to the needed temperature of the stable and the length of time necessary to leave the cows in the yard during the day, when the mercury in the thermometer has dropped to zero or below. With the knowledge thus gained and the light which is let in, we will be able to see that the maternal functions of the cow should be more carefully looked after and she more tenderly treated, as the means of not only bettering her condition but of the influences which she will transmit to her offspring. These tests are not only beneficial but highly educational; they teach humanitarianism in such a thorough and convincing way that the most obtuse mind can comprehend.

They compel a greater respect for the cow, and show conclusively that kindness, good care, pleasant and comfortable surroundings, a variety of good foods, properly fed, are all essential to the successful management of the herd.

After three years' experience with silage as one of the foods for winter dairying and for feeding young stock, we can give it our hearty indorsement. At the present time, with a strong and growing demand for fresh made winter butter, it would be utterly impossible to make a success of winter dairying without the aid of some succulent food. The tastes of the consumer of butter have undergone a wonderful change in the past few years.

Butter connoisseurs are getting to be in the majority. The public are fast becoming educated to a higher standard of excellence, and to meet these demands the producers are called upon to exercise greater care and skill and to bring to their work greater intelligence.

Having tried beet growing in the past we feel sure of our position when we say that corn properly put in the ground, thoroughly tilled and put into the silo at the right time and age,

makes the best and most economical food we have ever provided for stock.

This, of course, has no reference to the ordinary sown corn where from one-half to two bushels of seed is put upon an acre.

We are speaking of silage that is made from the corn where eight or nine quarts of seed are used for an acre, and of such variety as will grow the most luxuriant crop of fodder and which will furnish an abundance of grain and mature it to the roasting or glazed stage.

Such forage correctly housed in the silo is a grand food for winter feeding, besides being cheaper than any other food we have been able to provide. Our experience with silage has been entirely confined to corn. We believe the results which we have found will very nearly coincide with other dairymen who have made winter dairying a success, that the food must be palatable and appetizing, thus tempting the cow to eat more than is sufficient to sustain life. When we can succeed in doing this and the cow is of the dairy type she will work the excess up into butter product. We are thoroughly inclined to the belief that with our present mode of saving all the liquids from the stables by the aid of water-tight gutters and the use of absorbents and gypsum, we shall be able to put back upon the farm a sufficient amount of nitrogen to meet all demands in that direction for plant food. If so, then we have made a saving of one of the most costly elements that enters into plant growth.

Our experience in daily drawing the manures directly from the stables and spreading broadcast upon some part of the farm at all seasons of the year has been so satisfactory as to warrant us in recommending the same practice to others.

By this practice we dispose of the manure by once handling and we are getting much quicker returns from it. It is much upon the principle of compound interest. The liquid portions are immediately available and where the gypsum has been used there can be no loss through the atmosphere.

Where it is not practical to use the manure in this way we believe a great saving could be made by housing the manure in some way. The losses through the negligence of the manures in the past have been enough to bankrupt the farmers of the country.

It has been our practice while the cows are at pasture to give them a small grain ration of bran and cotton-seed meal. We also supplement the pastures with early cut clover, oats and peas, and corn. Experience and experiments have convinced us that the sooner a cow can satisfy her appetite and lay down to rest and chew the cud of contentment the better work she is doing for us. The dairyman who assists her in doing this is the one who has the longest end of the lever.

By this course of semi-soiling we are rapidly enriching the pastures and bringing them up to a high state of fertility and in the most economical way. Our main forage crop is oats and peas, which are put in as early in the spring as we can work the ground. We then supplement with two later sowings to make the season as long as we can. When the grain becomes too mature for soiling, it is cut with a reaper, cured in the gavel, then threshed for the grain. We have never fed a soiling food which gave such good results in amount or quantity of butter production as oats and peas. The butter will be firm, of coarse grain, stand up splendidly, though made in the hot sultry weather of July and August. As a grain ration it is equally as good.

Its general characteristics are very similar to cotton-seed meal. In buying food for the dairy we study not only its feeding, but its manurial value as well. While we are desirous of increasing the product of the dairy and anxious to grow large crops of all kinds, we do not forget that the permanent improvement of the farm is one of the strong points in successful farming, and should we err in any direction we prefer to have it upon the side of trying to do better.

We have thus outlined in a general way the practices observed upon the Hanover farm. How far we have been successful we prefer to leave to the judgment of those who are the best acquainted with the farm and what is being produced upon it. We are always looking for better methods and believe that there is room yet for great advancement. We hope to reduce the cost of production by increasing the amount and quality of the product.

W. R. EASTMAN.

The following communication was received from Mr. Jason Garlock, of Adams, N. Y.:

GEORGE L. FLANDERS, *Assistant Dairy Commis'r, Albany, N. Y.:*

Thoroughbred Jerseys and grades, and thoroughbred Holsteins and grades. By using thoroughbred sires and raising heifer-calves from my best cows.

In summer, when cows run in pasture, I feed morning and night one quart, to each cow, of ground oats mixed with good wheat bran, equal parts. In winter, early cut hay, good silage, some straw, a grain ration of peas, oats and barley (equal parts of each) ground; mix sixty pounds of it with forty pounds good wheat bran; feed milch cows from four to six quarts each day. Feed and water twice each day.

Not any. Water is pumped from the well by windmill into a tank in the house and water runs from tank to the barn.

Are kept in warm stable with plenty of straw to lie on and keep them clean. Straw and chaff. Milk is taken to the dairy as soon as drawn from the cows, is strained twice into a Stoddard creamery, cooled to forty-eight or fifty degrees with ice and water; milk stands from twelve to twenty-four hours; cream is taken off from top of milk with surface skimmer; cream is kept cool and sweet till I have enough for a churning, then it is ripened for churning; churn at sixty-two in summer and sixty-four in winter. I use the Gifford churn.

When butter comes in granules the size of small shot, stop churning, and to forty pounds of butter I add three gallons of brine; revolve the churn a few times, then draw off the butter-milk, then wash with water till it runs from the churn clear; keep it in a granular form all through the washing process, then salt and work in the churn till it is massed together; allowed to drain from twenty to thirty minutes, then it is packed in five-pound parafine boxes and sent to market by express.

By weighing their food and then weighing the milk, and the butter the milk makes. As to the feeding of silage, this is my third year with the silo, and no dairyman of to-day can afford to dairy it without a silo. That is my experience.

There is no food of any kind that the farmer can raise so much of on an acre for his stock as he can of corn, and there is no better feed for his stock than this corn cut up in the silo.

As to the manure made on the farm, it should be drawn from the stables to the field as fast as made, or kept under cover if left at the barn till used. My way of using the manure is to top-dress for winter wheat and spring grain, then seed with clover, eight quarts to the acre; take off one crop of clover, plow and sow to wheat or plant to corn for the silo; and I always get a good crop and my farm is growing better year by year.

Yours truly,

JASON GARLOCK.

ADAMS, N. Y.

BOONVILLE, N. Y., *November 26, 1891.*

MR. FLANDERS:

Dear Sir,—In reply to your communication concerning my dairy, I will say:

The kind of cattle I am keeping are thoroughbred Jerseys and grades and thoroughbred Guernseys and grades, about one-half of each.

To keep my dairy in good shape I raise from eight to twelve heifer calves every year, that gives me a chance to get rid of the old and poor ones.

In regard to feeding in summer they run in pasture with addition of fodder corn in latter part of season, in winter they are fed on mixed hay, silage, wheat bran and cotton-seed meal, mixing the grain with the silage; they go about three rods from outside of stable door to drink to a trough of running water with the temperature from fifty to sixty in cold weather.

My stables are a stone basement, absorbents we use is sawdust.

Milk is set in Reid creamery with the temperature from forty five to fifty degrees, sets twenty-four hours, the milk is drawn out from bottom of creamery, cream is then taken and ripened for twenty-four hours with the temperature at fifty-four, churned at the same temperature in an old-fashioned dash churn, when churned taken into a Reid butter-worker, worked, washed and salted at the rate of one ounce to the pound.

In regard to silage, I have been using it for the last three years and find it quite beneficial to feed with other fodder.

I have had very little experience in regard to commercial fertilizers, farmers ought to manufacture their own fertilizer.

I will give you an account from my dairy for the year 1890.

MADE BUTTER FROM FORTY-TWO COWS.

Whole amount of butter made, pounds.....	10,713
Received for same.....	\$2,686 03
Average per pound	\$0.25
Average pounds per cow.....	255
Hogs, pigs and calves sold.....	\$193 56
Making an average per cow.....	75 53

Respectfully yours,

MICHAEL KAW.

ONEIDA COUNTY, BOONVILLE, N. Y.

ELMWOOD STOCK FARM,
BOONVILLE, N. Y., *November 21, 1891.* }

GEORGE L. FLANDERS, Esq., *Assistant Dairy Commissioner :*

Dear Sir.—Absence is the cause of my not answering your esteemed favor of the second inst. I am striving to be a good farmer. If any thing I can say by way of expression or advice that will help some other fellow struggling in the same direction, you are welcome to it and so is he.

My herd consists of eighteen registered Holstein-Friesians and thirty-one grades and natives. I am as rapidly as possible filling up my dairy with pure breed Holsteins. To keep my stock strong

and vigorous, I buy as often as necessary a thoroughbred bull combining the leading milk and butter strains. If I must skimp anywhere, it will not be in the purchase of a bull, for I believe that judicious expenditure in that direction will pay better than in almost any other.

From May tenth to November tenth (usually) our cows are in pasture. After August first we have corn or clover to supplement the pasture. No grain is fed during this period. Our winter mixture consists of fifty pounds of ensilage and fodder of hay at noon to milkers. To dry stock we feed hay twice daily and twenty-five pounds of silage.

In addition to the above we feed to our cows in milk a grain ration of two parts of bran, one each of oil, cottonseed and corn meal. The grain ration is fed with the silage and thoroughly mixed.

Milkers are watered twice daily; other stock once. I am a firm believer in the benefits to be derived from warming your water before your stock drink it, but have been unable as yet to find any device or patent that did not involve too much trouble and expense. The water in my yard, however, never gets below forty; so I am not as badly off as some of my neighbors.

My stable is kept at not lower than fifty, and is regulated by ventilators that go up through the barn. These ventilator shafts are made of notched spruce, and kept cleaned so that the breath and odor from the stable shall not come in contact with the hay. The troughs in my stable are twelve inches deep and laid in water line.

The horse manure, with plenty of straw in it, is drawn every day and put in them; this, with the sawdust, or cut-straw used for bedding the cattle, makes a very good absorbent, and, with proper ventilation, keeps your stable sweet and clean.

Perhaps of most importance is the question you ask us to how we determine "whether individual cows are a source of profit."

There are two ways, by testing for the amount of butter fat and by weighing the milk of each animal; we only follow the last as we are more interested in cheese than in butter-making. There can be no doubt or question of the importance to every dairyman of testing his cows. There has been so much said and written about the inexcusable folly of keeping "a boarding-house for unprofitable cows" that I can add nothing to the arguments already advanced; anyone who has not already been convinced, or having been convinced, has neglected this most important feature of successful farming, will, I fear, ever adopt the idea or act up to his convictions.

We have a silo with capacity of about 225 tons, and cannot get along without it. This is our fourth year. We are now

wintering nearly twice as much stock as was done on the same farm before the silo was put in. What further argument is necessary?

Our land seems especially adapted to corn and our crop has never been less than twenty tons to the acre. I believe I can plow, cultivate and harvest enough ensilage to winter twenty-five cows as cheaply as I could cut, cure and house enough hay to do the same. We plant nothing but "Sibley's Pride of the North," as we found that to be the most luxurious variety that would mature in this climate. Do not harvest until in the roasting ear; then cut into the silo.

Until February first, last year, we fed no grain other than the corn in the silage as an experiment, and found that our stock milked well and kept in good condition on it.

My experience has only confirmed my impression that a silo is a necessary adjunct to successful farming. I am engaged in several branches of business; nothing pays better, in proportion to the capital invested, than farming.

I attribute this to two things, keeping none but good cows and a silo.

Very truly yours,

B. C. THARRATT.

WATERVILLE, N. Y., *November 19, 1891.*

MR. GEO. L. FLANDERS:

Dear Sir.—In reply to yours of November second I will try to answer your questions as briefly as possible.

Please do not imagine that we consider our methods perfect or that we are satisfied with our results. We are trying to learn how to do it and not trying to show others how, perhaps we shall succeed in showing some one how not to do.

Five and one-half years ago we bought a farm and started to do two things, to raise hay and make butter. I preferred to raise my own cows rather than to buy.

First. I now keep and have kept for four years a registered Jersey bull, buying when a calf and trying to obtain one from a butter family, have one registered Jersey cow, seven grade Jerseys and three natives. I do not breed the natives.

We feed corn ensilage, hay, bran, linseed, cotton-seed and corn meal. Hay is cut by wind power and fed dry with grain to the milkers at noon; morning and night, ensilage with grain.

Grain ration varies with season and the condition of the individual cow. Usually we make a standard mixture of the dry grain in as good proportion as possible to make a well balanced ration

with the hay and ensilage. Just now the standard ration is six pounds cut hay, forty pounds corn ensilage, four pounds bran, two pounds corn meal and one pound oil-meal.

That is the average ration for each cow for each day. The feeder varies it however to fit the individual cow. One cow for instance getting her three and one-half pounds of the grain mixture with her twenty pounds of ensilage in the morning, an extra two pounds of bran at noon with her hay and the balance of her ration at night.

We formerly mixed the grain and hay in a large trough but in a small dairy like ours and with the moist ensilage it is more convenient to mix the grain with hay or ensilage right in the manger.

Second. The same power that cuts the hay pumps water into a trough in the cow stable. Lowest temperature of water in zero weather when first pumped is forty-two, after standing comes to temperature of stable about fifty-six to sixty-five.

Cattle come into the barn in the fall and stay there until spring. The only exercise they have is walking once daily to the watering trough, longest distance for any cow about fifty feet. The bull, youngest calves, and cows about to calve, have box stalls.

Third. The bedding and manure from horse stable, waste hops, and wet straw with plenty of land plaster or gypsum used freely in gutters behind cows. Cows carded daily, udders brushed or washed off before milking.

Each cow's milk is carried directly to milk-room, set in channel cans in ice water in tank and cooled as rapidly as possible to forty-two.

Skimmed in twelve hours. Cream put in cans until full or for three skimmings stirring each time, warmed up to sixty-eight in water bath, or over boiling water, and at this season kept in warm room for twelve hours when it is ready to churn.

Use a Davis swing churn at sixty-four, butter washed in granular condition with brine and water until water comes clear (water must not be too cold at this season) put on worker, salt sprinkled on, three-quarter ounce to the pound, rolled sufficiently to cause salt to mix and disappear.

Pressed into pound prints and sold to local customers delivered weekly. Any surplus packed at once from worker into ten-pound butter boxes and sold on commission in New York.

Fourth. Each cow's milk is weighed morning and night, scales and record right behind the cows and weekly total entered in farm book.

Occasionally a friend who has a Babcock tester makes a test for me of each cow's milk. At time of last test, May nineteenth, the average for the whole dairy was 5.2 per cent of butter fat

Previous to the Babcock test we used to churn two pounds of milk from each cow in a two quart fruit jar, results are practically the same but the Babcock test saves time.

Fifth. We are feeding ensilage for the third winter. Actual cost of ration for each cow before we had a silo was seventeen cents per day, the first winter after, with the same grain ration, the cost per cow was twelve cents per day, to-day with the ration as above the cost per day is about eleven cents.

The difference in cost of food is a fair index of the value of the silo. The product is better, the cattle look well and are ready for business all the time. We try to have the cows fresh in the fall and early winter.

The average yearly production per cow for the past four years has been 234 pounds of butter; average price for same period, twenty-six cents.

Sixth. In order to get more manure, I have for last two years bought farrow cows (six or eight) in the fall and turned them for beef in spring, or as soon as they stopped milking.

They have reduced my butter record, but increased my manure product and brought something at the butchers. The manure is spread on the farm as fast as made, except where the crops are growing or the snow drifts too deep for the horses to get through.

Nothing less than 100 wagon loads per year is considered a fair product, and we spread that on thirty-three acres, of which about twenty acres are meadow.

We get good crops of hay, and raise two sets of pigs yearly. Have nine young heifers of all ages, from six weeks to two years. As each of these has a butter bull for a sire and a good grade for a dam, we hope in the next four years to have no cow that will not produce a full 300 pounds butter per year.

Trusting that I have not been too long in the telling of this,

I am yours very truly,

C. WILSON.

DAIRY METHODS PURSUED AT LAKESIDE BY SMITH & POWELL.

GEORGE L. FLANDERS, Esq., *Assistant Dairy Commissioner*:

Dear Sir.— We will very gladly answer your inquiries regarding our methods of dairying.

For the past fifteen years we have kept and bred only pure, recorded Holstein-Friesian cattle; for several years our milking cows numbered from 100 to 150 head, and in a few instances much higher.

After commencing with this breed it required several years of careful breeding, selecting and weeding before we could make our entire herd average 10,000 pounds of milk in a year, but after this point had once been attained, and the milking tendencies had become an established characteristic of every cow therein, and by using only sires in whose veins course only the blood of ancestors which had become famous for their phenomenal production, we not only found that the average yield of our herd increased more rapidly, but it could with less effort be maintained.

For many years the average of our entire herd of cows, including heifers, has not been below 12,000 pounds of milk per annum and frequently higher.

In 1881 our entire herd of mature cows averaged 14,164 pounds fifteen ounces. In 1882 our entire herd, eight three-year-old heifers, averaged 12,388 pounds nine ounces.

At the close of the year 1885 we found that twenty cows had averaged 15,677 pounds nine ounces, which included all cows four years old and over which had completed their records during this year.

During the same year fifteen two-year-olds averaged 12,307 pounds eight ounces, and twenty-four two-year-olds, all that had completed their records, averaged 10,810 pounds.

In 1886 our highest average was made when our mature cows averaged 17,166 pounds one ounce, and thirty-four two-year-olds, all that completed their records, averaged 12,465 pounds seven ounces.

For many years our attention has been directed toward the improvement of the quality of milk, rather than to the increase of quantity. The results in this direction have been very marked and gratifying.

The quality has been greatly improved while the quantity has been maintained.

Many years since we began testing individual cows, with a view to prove by actual trial which cows and what families were superior for butter, that we might discard all others.

When the Advanced Registry was adopted by the Holstein-Friesian Association we made that our standard, and decided that no cow could have a place in the breeding herd at "Lakeside" unless she was capable of entering the Advanced Registry, on both the weekly butter and yearly milk tests.

Butter records to entitle a cow to this Advanced Registry must be as follows: "The butter shall be of good, marketable quality, salted not higher than one ounce of salt to a pound of butter, and worked free from any excess of water and buttermilk."

The requirements are "not less than nine pounds per week, if calving at just two years old; not less than eleven pounds, if calv-

ing at just three years old; not less than thirteen pounds, if calving at just four years old; not less than fifteen pounds, if calving at five years or over; an increase of nine-one-hundredths of an ounce must be made for every day above the years two, three and four."

The milk record for long tests, which is the one we have adopted, is 6,500 pounds in ten consecutive months for two-year-olds, three-year-olds 9,700 pounds in ten months, four-year-olds 9,300 pounds in ten months, and five-year-olds 10,700 pounds in ten months.

There is also a small fraction to be added for each day that the cow exceeds the age specified.

When these rules were adopted we went systematically to work to test every cow in our herd which had not previously been given the same kind of a test; we also kept a record of the amount of milk required to make a pound of butter.

After commencing these tests it was some years before a cow made twenty pounds of butter in a week, or averaged a pound of butter from less than twenty pounds of milk. Since then we have tested ninety cows whose records averaged twenty pounds 6 34-45 ounces per week; twenty-two cows which averaged twenty-four pounds 3 7-11 ounces per week; twenty heifers, three years old, which averaged nineteen pounds 1 3-5 ounces; twenty-one heifers, two years old, which averaged fourteen pounds, and sixty-three heifers, two years old, which averaged twelve pounds 8 8-9 ounces per week.

It was some years after we began testing our cows for butter, before a week's test showed an average of a pound of butter from less than twenty pounds of milk; but within the past few years forty cows have been tested in our herd which show an average of a pound of butter from thirteen and one-half to eighteen pounds of milk.

If these figures show that we have met with success in our efforts to improve our herd, as well as the breed which it represents, then the question will naturally be asked, how has this been accomplished? What system has led to such results?

First. The most important factor in the improvement of our herd has been careful and judicious breeding, by which means have been concentrated and intensified in the offspring the desirable characteristics of both progenitors, and by which the powers of production either for milk or butter can be increased from generation to generation.

Success can be assured by using only such progenitors on both sides as possess in a marked degree, and which have become so thoroughly established as to be transmitted, those qualities which are desired.

In the offspring these qualities should be thoroughly established family characteristics. Many a cow which is individually a superior producer, fails to transmit these qualities to an offspring because these traits are not so thoroughly established as to be transmitted.

It is for this reason that so many breeders are disappointed in the offspring of bulls for which they have paid a high price merely because the dam has made a large record. Look carefully to every line of breeding back through many generations if you wish to be assured of the best results.

Second. Careful and judicious selection in order that we might have the best possible foundation — the best of its kind on which to improve by breeding.

Third. Development — by which means the dormant faculties are aroused into activity and growth. This is accomplished by good care, judicious feeding, proper selection of food, regularity in all respects, and the watchful eye that pertains to the comfort and health of the herd.

To keep our herd continually vigorous we replace all animals which have become defective with young animals of our own breeding, the older ones, excepting those which are particularly desirable for breeding purposes, being disposed of.

We have, however, found that our cows are generally as good at from ten to fourteen years of age as when younger.

Our methods of feeding are as follows: In the summer our cows are turned to pasture, with no grain, when pastures are fresh and abundant, but as the feed becomes short a small grain ration, consisting of about equal parts by weight of bran, ground oats, and corn meal is added, and increased according to the necessities of the case.

In the autumn our cows are put into the stables nights, before the weather becomes cold and frosty. During the winter they are fed on ensilage and hay — sometimes half and half but more frequently two-thirds of ensilage to one-third of hay.

They are also fed roots in small quantities, beets and carrots — the latter being far preferable — and a grain feed, the same mixture as above, with a very small amount of linseed meal, from six to eighteen pounds per day, according to the condition of the animal and the flow of milk.

This is divided in three feeds per day. Our dry cows and those giving a small amount of milk are fed no grain.

Our cows are watered in the stable, as we think they should be, but are turned into a yard to drink, and watered from a trough where the chill has some seasons been taken off the water by turning in a steam-pipe.

Some years we have not done this; but allow us to say that we would not advise other breeders to follow our example in this respect. We should recommend watering in the barn, and in cold weather the water should be tempered, so as to produce no chill, and turn the cows into a yard which is protected from the bleak north winds for exercise, but where they will get no water.

When fresh and giving a large flow our cows are milked three times per day, but after they have been in milk some time, and the flow is not so great, they are milked twice a day.

A record is kept of every milking of every cow. Our scales, which hang in the milk-room, are adjusted so as to take out the weight of the pail without any deduction being made by the milker, the exact weight of the milk being given in each instance.

A blackboard is hung on the side of the wall, where each milking is registered at the time. This is drawn off by the foreman each day on a monthly milk book, which contains the name of each cow on a page by itself, and the name of the milker; each man having so many cows under his charge, which he is required to milk regularly, commencing at a stated time at each milking, and milking the cows in the same order each day.

At the close of each month these monthly milk books are replaced by new ones and taken to the office where the record of each cow is carefully footed and entered on a book kept for the purpose.

We can thus give any day's, month's or year's record of any cow for many years.

Immediately after milking, the milk is carried to the creamery where it is strained in a large vat, preparatory to running through the separator.

The cream is then put into a large pan and ripened preparatory to churning — our butter-maker depending upon his taste when the cream is in proper condition for churning. The cream is churned at a temperature of fifty-eight degrees in summer and sixty degrees in winter.

When the butter is in the granulated state the buttermilk is drawn off and the butter is thoroughly washed in cold water until it comes out free from buttermilk and entirely clear.

It is then rinsed with brine so as to remove every particle of buttermilk. It is then salted one ounce to the pound, carefully stirred but not worked, and put into a tub where it stands for twenty-four hours when it is worked and packed.

Our butter has been sold for six years to one firm in this city. It is packed in small crocks of from six to twelve pounds and delivered to them fresh after churning and is delivered by them at once, in the original package, to their customers.

This method has seemed to give the very best satisfaction.

The party who handles our butter claims that he has always paid us from twenty-five to thirty-three and one-third per cent above the price obtained by the usual class of butter-makers.

By keeping the record of the milk production of each individual cow and by occasionally making a week's butter test of each, we can easily determine which cows are profitable and we would at once recommend every dairyman to procure a set of scales and a blackboard, and a book properly ruled, for the purpose of keeping the record of every cow in his herd, for a year.

This is the greatest educator of any method we have ever known to be adopted.

In answer to your inquiry regarding ensilage, we will say that we have fed it largely for at least ten to twelve years.

When properly grown and properly put up we believe it to be an excellent food, and profitable.

We believe it to be healthy for stock, and that it produces a superior quality of milk and butter.

Of course, poor ensilage is worthless, and should never be used; the corn should be well grown, so as to produce good ears, and should be cut when the corn is well glazed.

To keep our stables free from odor the manure is removed twice a day and the drops, which are made tight, and in the bottom of which, after cleaning, we sprinkle cut straw or muck, and sometimes use plaster.

Our manure is drawn directly to the field, whenever the ground is in condition to receive it and the roads are such as to make it practicable; when this cannot be done it is wheeled directly to a covered manure shed with a cement wall, so as to keep out all rain water and to retain all the liquids.

This, whenever it is possible to do so, is drawn upon the land where we wish to use it; our idea being that there is less waste when manure is immediately put upon the soil than in any other manner of handling it. This, however, is not practical when the surface of the ground is covered with ice, especially if the land is sloping, for in such a case there is usually a large waste by being washed away by the first rains.

If any dairyman or farmer can be benefited by our experience it will afford us great pleasure.

Very truly yours,

SMITHS & POWELL.

The work performed in the several divisions of the State, with the exception of the first and sixth division, is given in detail in the report of the assistant commissioner in charge, and

is attached hereto as a part of the appendix. In addition to the work so reported by them, the work performed in the first and sixth division, comprising fourteen counties, is in the aggregate as follows: We have inspected milk delivered at factories within these counties from 307 different dairies.

We have made 2,500 examinations of milk being sold upon the streets in cities and villages. We have taken twenty-one samples of milk to the chemist. We have made an examination of vinegar being sold in these divisions and have taken four samples to the chemist for analysis.

The prosecutions in this division have been as follows:

CASE No. 2816.

THE PEOPLE *v.* ARAN VAIL.

Police Court, before Justice Stephens.

Warrant issued April 2, 1891; answered to April 3, 1891; adjourned to April 9, 1891. Pleaded guilty. Fined twenty-five dollars.

Witnesses: James E. Ryan, Simon Nussbaum; R. D. Clark, chemist.

CASE No. 3439.

THE PEOPLE *v.* ANDREW SCHELLER.

Police Court, before Justice Stephens.

Warrant issued September 21, 1891; answered to September 21, 1891. Pleaded guilty. Fined twenty-five dollars.

Witnesses: Simon Nussbaum, Charles Burke and R. D. Clark, chemist.

CASE No. 3444.

THE PEOPLE *v.* FRED CRAMER.

Police Court, before Justice Stephens.

Warrant issued October 7, 1891; returnable October 19, 1891; adjourned to October 21, 1891. Pleaded guilty. Fined twenty-five dollars.

Witnesses: Simon Nussbaum, Charles Burke and R. D. Clark, chemist.

CASE No. 3438.

PEOPLE v. A. G. LODEWICK.

Police Court, before Justice Stephens.

Warrant issued August 18, 1891. Upon arraignment defendant pleaded guilty and was fined twenty-five dollars.

Witnesses: Simon Nussbaum, Charles Burke and R. D. Clark, chemist.

CASE No. 177 — VINEGAR.

PEOPLE v. STEWART & WILSON.

Police Court, before Justice Donahoe, Troy, N. Y.

Warrant issued ; answered to
Defendant examined before Justice Donahoe
and discharged.

Witnesses: Simon Nussbaum, Charles Burke and R. D. Clark, chemist.

Information was laid before the grand jury of Rensselaer county on the day of , 1891; said jury failed to find an indictment. The nature of this case was such that we deemed it necessary not to cease our attempts with these two failures. The vinegar itself was not cider vinegar, it was in imitation or semblance of cider vinegar and was sold as and for cider vinegar to the customers of said Stewart & Wilson, as was shown by the testimony before Justice Donahoe. At least the testimony showed that a member of the firm of Stewart & Wilson so stated to one of our agents. For these reasons we brought a Supreme Court action for a penalty of \$200, as provided by section 7 chapter 515 of the Laws of 1889. This action is still pending and was No. 253 upon the calendar of the last term of court held in Rensselaer county. The court adjourned, however, before reaching this case.

CASE No. 178.

THE PEOPLE v. WM E. DRISLANE.

Police Court, before Justice Stephens.

Warrant issued January 30, 1891; answered to February 4, 1891, by pleading not guilty. A partial examination was had and examination adjourned to February 19, 1891, at which time the examination was concluded. March seventeenth, Police Justice Stephens rendered his decision, holding the defendant for trial for Special Sessions, March thirty-first. Special Sessions pleaded not guilty. April , 1891, defendant withdrew former plea and pleaded guilty.

CASE No. 180.

THE PEOPLE v. J. J. SHEA.

Police Court, Justice Eisenminger, Schenectady, N. Y.

Warrant issued May 5, 1891; answered to May 7, 1891. Adjourned to May fourteenth, to May twenty-second, to May twenty-ninth. May twenty-ninth defendant examined and held for grand jury. September 16, 1891, information laid before grand jury, and a bill of indictment was found. November 13, 1891, the case was moved for trial at Oyer and Terminer before Mr. Justice Tappen.

The case was given to the jury at 10 o'clock a. m., November 14, 1891; they were out until 3 p. m. and came in and reported to the court that it was impossible for them to agree and were thereupon discharged. This case being upon an indictment will be tried again at the next term of court.

DETAILED STATEMENT of the commissioner, assistant commissioner, experts, agents, claimants and counsel, appointed and employed during the year, together with their compensation, expenses and disbursements for the fiscal year ending September 30, 1891.

PAYEE.	Position held.	Date of check.	Compensation.	Expenses.
George L. Flanders.....	Assistant commissioner	1890.	.....	\$71 82
George Bernhard.....	Expert.....	October	\$100 00	21 37
Stillwell & Gladding.....	Chemists.....	"	64 00	1 50
Wilfred H. Sage.....	Chemist.....	"	100 00	.....
James W. Mulcahy.....	Expert.....	"	80 00	43 69
James W. Walsh.....	Expert.....	"	80 00	51 36
Samuel A. Lattimore.....	Chemist.....	"	120 00	4 50
Charles J. Morganstern	Expert.....	"	80 00	60 58
William G. Spence.....	Expert.....	"	90 00	59 34
John H. Foley.....	Assistant commissioner	"	150 00	9 01
Stillwell & Gladding.....	Chemists.....	"	118 50	5 55
Stillwell & Gladding.....	Chemists.....	"	20 00	.....
E. G. Love.....	Chemist.....	"	69 25	2 34
James E. Ryan.....	Expert.....	"	100 00	26 65
Charles Van Loon.....	Laborer.....	"	30 00	.....
Frank Elliot.....	Expert.....	"	75 00	18 10
Marcus A. Perry.....	Assistant commissioner	"	166 67	5 06
James A. Story.....	Expert.....	"	75 00	47 30
Josiah K. Brown.....	Commissioner.....	"	.....	23 88
E. S. Wilson.....	Expert.....	"	100 00	53 35
T. R. Gray.....	Expert.....	"	100 00	49 35
William W. Meeteer.....	Expert.....	"	100 00	49 61
James H. Brown.....	Assistant commissioner	"	100 00	36 51

Arch. D. Clark.....	Expert.....	"	15	100 00	43 25
Arthur C. Salmon.....	Attorney.....	"	15	75 00	.....
B. F. Van Valkenburgh.....	Assistant commissioner.....	"	15	208 34	99 79
Michael Galligan.....	Expert.....	"	15	75 00	25 44
Peter Drexelius.....	Assistant commissio er.....	"	15	166 67	22 92
John J. Coughlan.....	Expert.....	"	15	100 00	13 68
John Gardiner.....	Expert.....	"	15	75 00	35 60
F. P. Vandenburg.....	Chemist.....	"	15	100 00	2 25
Samuel Abrams.....	Expert.....	"	15	100 00	16 82
R. D. Clark.....	Expert.....	"	15	.....	34 83
Charles S. Kellogg.....	Expert.....	"	15	72 00	68 69
F. D. Tuthill.....	Assistant commissioner.....	"	15	150 00	36 31
W. J. Corbett.....	Expert.....	"	15	80 00	23 17
T. C. Du Bois.....	Expert.....	"	15	100 00	64 21
J. A. Polhemus.....	Stenographer.....	"	15	27 70	4 50
Van Hoevenburgh & Holt.....	Attorneys.....	"	15	15 00	.....
P. J. Sutley.....	Assistant commissioner.....	"	15	166 67	59
George W. Price.....	Expert.....	"	15	80 00	73 90
M. B. Jewell.....	Expert.....	"	15	100 00	49 80
O. C. Griffiths.....	Expert.....	"	15	60 00	78 95
Joseph F. Geisler.....	Chemist.....	"	15	139 00	50
Joseph F. Geisler.....	Chemist.....	"	15	65 38	70
William Manlius Smith.....	Chemist.....	"	15	60 00	.....
A. V. Pratt.....	Attorney.....	"	15	90 00	.....
Peter H. Parker.....	Assistant commissioner.....	"	15	100 00	94 68
John E. Cady.....	Expert.....	"	15	75 00	68 35
R. H. Palmer.....	Expert.....	"	15	80 00	90 05
Charles Sears.....	Expert.....	"	15	52 00	56 16
Simon Nusbaum.....	Expert.....	"	31	100 00	20 59
W. S. O'Brien.....	Expert.....	November	1	80 00	13 65
J. K. Brown.....	Commissioner.....	"	1	250 00	.....

DETAILED STATEMENT of the commissioner, assistant commissioner, experts, agents, claimants and counsel, appointed and employed during the year, together with their compensation, expenses and disbursements for the fiscal year ending September 30, 1891.

PAYEE.	Position held.	Date of check.	Compensation.	Expenses.
George L. Flanders.....	Assistant commissioner	1890. 7	.....	\$71 82
George Bernhard.....	Expert.....	" 15	\$100 00	21 37
Stillwell & Gladding.....	Chemists.....	" 15	64 00	1 50
Wilfred H. Sage.....	Chemist.....	" 15	100 00	.....
James W. Mulcahy.....	Expert.....	" 15	80 00	43 69
James W. Walsh.....	Expert.....	" 15	80 00	51 36
Samuel A. Lattimore.....	Chemist.....	" 15	120 00	4 50
Charles J. Morganstern.....	Expert.....	" 15	80 00	60 58
William G. Spence.....	Expert.....	" 15	90 00	59 34
John H. Foley.....	Assistant commissioner	" 15	150 00	9 01
Stillwell & Gladding.....	Chemists.....	" 15	118 50	5 55
Stillwell & Gladding.....	Chemists.....	" 15	20 00	.....
E. G. Love.....	Chemist.....	" 15	69 25	2 34
James E. Ryan.....	Expert.....	" 15	100 00	26 65
Charles Van Loon.....	Laborer.....	" 15	30 00	.....
Frank Elliot.....	Expert.....	" 15	75 00	18 10
Marcus A. Perry.....	Assistant commissioner	" 15	166 67	5 06
James A. Story.....	Expert.....	" 15	75 00	47 30
Josiah K. Brown.....	Commissioner.....	" 15	.....	23 88
E. S. Wilson.....	Expert.....	" 15	100 00	53 35
T. R. Gray.....	Expert.....	" 15	100 00	49 85
William W. Meeteer.....	Expert.....	" 15	100 00	49 61
James H. Brown.....	Assistant commissioner	" 15	100 00	36 51

Arch. D. Clark.....	Expert.....	"	15	100 00	43 25
Arthur C. Salmon.....	Attorney.....	"	15	75 00	.....
B. F. Van Valkenburgh.....	Assistant commissioner.	"	15	208 34	99 79
Michael Galligan.....	Expert.....	"	15	75 00	25 44
Peter Drexelius.....	Assistant commissio er	"	15	166 67	22 92
John J. Coughlan.....	Expert.....	"	15	100 00	13 68
John Gardiner.....	Expert.....	"	15	75 00	35 60
F. P. Vandenburg.....	Chemist.....	"	15	100 00	2 25
Samuel Abrams.....	Expert.....	"	15	100 00	16 82
R. D. Clark.....	Expert.....	"	15	.....	34 83
Charles S. Kellogg.....	Expert.....	"	15	72 00	68 69
F. D. Tuthill.....	Assistant commissioner	"	15	150 00	36 31
W. J. Corbett.....	Expert.....	"	15	80 00	23 17
T. C. Du Bois.....	Expert.....	"	15	100 00	64 21
J. A. Polhemus.....	Stenographer.....	"	15	27 70	4 50
Van Hoevenburgh & Holt.....	Attorneys.....	"	15	15 00	.....
P. J. Sutley.....	Assistant commissioner	"	15	166 67	59
George W. Price.....	Expert.....	"	15	80 00	73 90
M. B. Jewell.....	Expert.....	"	15	100 00	49 80
O. C. Griffiths.....	Expert.....	"	15	60 00	78 95
Joseph F. Geisler.....	Chemist.....	"	15	139 00	50
Joseph F. Geisler.....	Chemist.....	"	15	65 38	70
William Manlius Smith.....	Chemist.....	"	15	60 00	.....
A. V. Pratt.....	Attorney.....	"	15	90 00	.....
Peter H. Parker.....	Assistant commissioner	"	15	100 00	94 68
John E. Cady.....	Expert.....	"	15	75 00	68 35
R. H. Palmer.....	Expert.....	"	15	80 00	90 05
Charles Sears.....	Expert.....	"	15	52 00	56 16
Simon Nussbaum.....	Expert.....	"	31	100 00	20 59
W. S. O'Brien.....	Expert.....	November	1	80 00	13 65
J. K. Brown.....	Commissioner.....	"	1	250 00	.....

DETAILED STATEMENT — (Continued).

PAYEE.	Position held.	Date of check.	Compensation.	Expenses.
George L. Flanders	Assistant commissioner	1900. November 1	\$166 66	.....
George B. Fellows	Expert.	" 1	100 00	.....
R. D. Clark	Chemist	" 8	166 66	.....
George L. Flanders	Assistant commissioner	" 8	.....	\$234 68
F. D. Curtis	Butter expert	" 14	115 00	83 69
W. W. Hall	Cheese expert	" 14	135 00	90 16
George A. Smith	Cheese expert	" 14	150 00	74 98
M. T. Morgan	Cheese expert	" 14	135 00	92 95
E. J. Wheeler	Chemist	" 14	100 00	.....
A. S. Delano	Vinegar expert.	" 14	100 00	39 96
Hoffman Ruger	Vinegar expert.	" 14	75 00	9 95
J. J. Sorogan	Expert.	" 14	100 00	62 36
Charles D. Olendorf	Attorney	" 14	30 00	.....
Joseph F. Gaisler	Chemist	" 14	102 01	3 00
George Bernhard	Expert.	" 14	100 00	4 00
John H. Foley	Assistant commissioner	" 14	150 00	18 98
McNaughton & Taylor	Attorneys	" 14	140 00	6 00
E. S. Wilson	Expert.	" 14	100 00	48 75
Patrick J. Sutley	Assistant commissioner	" 14	166 67	68 64
James W. Mulcay	Expert	" 14	80 00	43 62
Frank Elliot	Expert	" 14	75 00	56 78
Charles J. Morganstern	Expert	" 14	80 00	38 37
John E. Cady	Expert	" 14	75 00	39 81
Peter H. Parker	Assistant commissioner	" 14	100 00	79 15
John Gardener	Expert	" 14	75 00	39 58
F. D. Tuthill	Assistant commissioner	" 14	150 00	26 50

William G. Spence.....	Expert.....	"	14	84 00	43 39
George W. Price.....	Expert.....	"	14	80 00	62 30
Thomas Byrnes.....	Expert.....	"	14	75 00	85 92
Charles S. Kellogg.....	Expert.....	"	14	81 00	62 61
Charles Sears.....	Expert.....	"	14	80 00	85 46
James W. Walsh.....	Expert.....	"	14	80 00	34 58
Charles Van Loon.....	Laborer.....	"	14	30 00	.....
O. P. Stockwell.....	Attorney.....	"	14	75 00	.....
A. C. Salmon.....	Attorney.....	"	14	50 00	.....
B. F. Van Valkenburgh.....	Assistant commissioner.....	"	14	208 33	64 95
James H. Brown.....	Assistant commissioner.....	"	14	100 00	20 91
R. D. Clark.....	Chemist.....	"	14	.....	20 42
W. W. Meeteer.....	Expert.....	"	14	100 00	59 85
W. J. Corbett.....	Expert.....	"	14	80 00	20 45
T. R. Gray.....	Expert.....	"	14	100 00	50 60
Francis V. S. Oliver.....	Attorney.....	"	14	30 00	.....
Arch. D. Clark.....	Expert.....	"	14	100 00	36 15
John J. Coughlin.....	Expert.....	"	14	100 00	6 23
Peter Drexelius.....	Assistant commissioner.....	"	14	166 67	8 50
Samuel Abrams.....	Expert.....	"	14	100 00	7 41
Michael Galligan.....	Expert.....	"	14	75 00	18 48
Charles D. Olendorf.....	Att. rney.....	"	14	160 00	.....
E. G. Love.....	Chemist.....	"	14	16 00	.....
E. G. Love.....	Chemist.....	"	14	60 00	90
Stillwell & Gladding.....	Chemists.....	"	14	16 00	25
Stillwell & Gladding.....	Chemists.....	"	14	82 00	1 75
Joseph F. Geisler.....	Chemist.....	"	14	24 00	25
Joseph F. Geisler.....	Chemist.....	"	14	27 50	1 00
Wilfred H. Sage.....	Chemist.....	"	14	100 00	9 50
Samuel A. Lattimore.....	Chemist.....	"	14	115 00	.....
Harry Snyder.....	Chemist.....	"	14	45 00	75

DETAILED STATEMENT — (Continued).

PAYEE.	Petition held.	Date of check.	Compensation.	Expenses.
		1900.		
William Manlius Smith.....	Chemist.....	November 14	\$24 00	.....
F. P. Vandenburg.....	Chemist.....	" 14	100 00	.....
James E. Ryan.....	Expert.....	" 14	100 00	\$44 54
O. C. Griffiths.....	Expert.....	" 14	80 00	86 21
T. C. Du Bois.....	Expert.....	" 14	100 00	.....
J. K. Brown.....	Commissioner.....	" 15	.....	66 80
R. H. Palmer.....	Expert.....	" 15	80 00	47 50
Simon Nusbaum.....	Expert.....	" 15	100 00	15 06
J. K. Brown.....	Commissioner.....	December 1	250 00	.....
George L. Flanders.....	Assistant commissioner.....	" 1	166 66	.....
George B. Fellows.....	Expert.....	" 1	100 00	.....
R. D. Clark.....	Chemist.....	" 1	166 66	.....
George A. Smith.....	Cheese expert.....	" 2	150 00	52 13
Eugene Crawford.....	Stenographer.....	" 2	20 00	.....
Thomas Byrnes.....	Expert.....	" 11	36 00	39 45
T. C. Du Bois.....	Expert.....	" 11	100 00	9 00
George W. Price.....	Expert.....	" 11	80 00	31 35
F. D. Tuthill.....	Assistant commissioner.....	" 11	150 00	28 00
Arthur Moore.....	Attorney.....	" 11	15 00	.....
John Gardenier.....	Expert.....	" 11	75 00	45 30
George A. Hutchinson.....	Expert.....	" 11	18 00	11 72
C. S. Kellogg.....	Expert.....	" 11	66 00	39 42
W. J. Corbett.....	Expert.....	" 11	80 00	.....
W. W. Meeteer.....	Expert.....	" 11	100 00	58 78
Thomas R. Gray.....	Expert.....	" 11	100 00	56 49

J. J. Sorogan	Expert.	11	100 00	50 72
Benjamin W. Downing	Attorney	11	210 00	.....
Charles Sears	Expert.	11	80 00	66 31
D. H. Turner	Expert.	11	25 00	.....
Michael Galligan	Expert.	11	75 00	16 62
Samuel Abrams	Expert.	11	100 00	8 23
John J. Coughlin	Expert.	11	100 00	6 27
O. C. Griffiths	Expert.	11	80 00	63 00
Peter H. Parker	Assistant commissioner.	11	100 00	55 71
Arch. D. Clark	Expert.	11	100 00	38 82
Peter Drexelius	Assistant commissioner.	11	166 67	34 48
E. S. Wilson	Expert.	11	100 00	36 75
James H. Brown	Assistant commissioner.	11	100 00	14 99
Hoffman Ruger	Vinegar expert	11	75 00	21 50
F. D. Curtis	Butter expert.	11	45 00	21 71
W. W. Hall	Cheese expert.	11	100 00	39 90
A. S. Delano	Vinegar expert.	11	100 00	30 94
M. T. Morgan	Cheese expert.	11	100 00	37 23
B. F. Van Valkenburgh	Assistant commissioner	11	208 34	100 26
E. G. Love	Chemist.	11	38 75	.....
Joseph F. Geisler	Chemist.	11	9 38	.....
Joseph F. Geisler	Chemist.	11	24 00	.....
Joseph F. Geisler	Chemist.	11	46 75	.....
F. P. Vandenberg	Chemist.	11	100 00	8 10
Stillwell & Gladding	Chemists	11	40 25	8 19
Stillwell & Gladding	Chemists	11	56 40	1 25
George L. Flauders	Assistant commissioner	15	.....	64 78
James E. Ryan	Expert.	15	100 00	58 76
W. G. Spence	Expert.	18	84 00	20 35
D. L. Atkins	Attorney	18	28 00	5 02
W. H. Sage	Chemist.	18	100 00	6 56

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DETAILED STATEMENT — (Continued).

PAYEE.	Position held.	Date of check.	Compensation this.	Expenses.
C. J. Morganstern.....	Expert	1890 November 18	\$20 00	\$31 82
James W. Walsh	Expert	" 18	80 00	22 80
James W. Mulcay	Expert	" 18	80 00	24 12
Frank Elliot	Expert	" 18	75 00	21 76
John E.ady	Expert	" 18	75 00	24 08
George Bernhard	Expert	" 18	100 00	7 84
Charles Van Loon	Laborer	" 18	30 00	.....
M. A. Perry	Expert and agent	" 18	100 00	2 60
John H. Foley	Assistant commissioner	" 18	150 00	2 00
A. C. Salmon	Attorney	" 18	205 00	2 24
R. H. Palmer	Expert and agent	" 18	80 00	03 04
P. J. Sutley	Assistant commissioner	" 18	106 67	54 31
S. A. Lattimore	Chemist	" 18	100 00	.....
J. R. Thompson	Stenographer	" 18	25 00	.....
Geo. Lowenberg	Stenographer	" 18	18 25	.....
J. K. Brown	Commissioner	" 24	250 00	.....
Geo. L. Flanders	Assistant commissioner	" 24	166 04	.....
Geo. B. Fellows	Expert and agent	" 24	100 00	.....
R. D. Clark	Chemist	" 24	106 68	.....
R. D. Clark	Chemist	" 31	.....	11 06
Simon Musbaum	Expert and agent	" 31	100 00	0 10
Eugene Crawford	Stenographer	" 31	40 00	4 80
Thos. L. Quigley	Expert and agent	" 31	12 00	.....
Geo. L. Flanders	Assistant commissioner	1891. January 5	.....	15 50
James H. Brown	Assistant commissioner	" 5	100 00	87 50

Arch. D. Clark	Expert and agent	14	100 00	38 60
LaRoy S. Gove	Attorney	14	95 00	20
Thomas R. Gray	Expert and agent	14	100 00	38 75
E. G. Love	Chemist	14	40 00	.....
Wm. W. Meeteer	Expert and agent	14	100 00	47 46
F. V. S. Oliver	Attorney	14	30 00	.....
A. C. Salmon	Attorney	14	25 00	.....
J. J. Sorogan	Expert and agent	14	100 00	46 63
B. F. Van Valkenburgh	Assistant commissioner	14	208 33	44 80
E. S. Wilson	Expert and agent	14	100 00	44 10
Frank Elliot	Expert and agent	14	75 00	16 52
James Mulcay	Expert and agent	14	80 00	.....
W. H. Sage	Chemist	14	100 00	11 75
P. J. Sutley	Assistant commissioner	14	166 67	68 38
James W. Walsh	Expert and agent	14	80 00	27 55
Samuel Abrams	Expert and agent	14	100 00	8 61
W. J. Corbett	Expert and agent	14	80 00	2 00
J. J. Coughlin	Expert and agent	14	100 00	5 91
Peter Drexelius	Assistant commissioner	14	166 67	14 78
Michael Galligan	Expert and agent	14	75 00	18 13
F. P. Vandenburg	Chemist	14	100 00	.....
John E. Cady	Expert and agent	14	75 00	73 98
O. C. Griffiths	Expert and agent	14	80 00	30 63
Peter H. Parker	Assistant commissioner	14	100 00	58 64
Charles Sears	Expert and agent	14	80 00	71 90
T. C. Du Bois	Expert and agent	14	100 00	31 83
George W. Price	Expert and agent	14	80 00	59 53
R. D. Tuthill	Assistant commissioner	14	150 00	34 81
F. D. Curtis	Butter expert	14	40 00	4 64
W. W. Hall	Cheese expert	14	45 00	18 08
M. T. Morgan	Cheese expert	14	45 00	19 06

DETAILED STATEMENT — (Continued).

PAYEE.	Position held.	Date of check.	Compensation.	Expenses.
George A. Smith.....	Cheese expert.....	14	\$150 00	\$69 71
A. S. Delano.....	Vinegar expert.....	14	100 00	32 15
Hoffman Ruger.....	Vinegar expert.....	14	75 00	8 39
John Gardenier.....	Expert and agent.....	14	75 00	38 19
W. G. Spence.....	Expert and agent.....	14	63 00	.....
Charles Van Loon.....	Laborer.....	14	30 00	10
James E. Ryan.....	Expert and agent.....	14	100 00	24 59
George Bernhard.....	Expert and agent.....	19	100 00	3 28
Theodore Deecke.....	Chemist.....	19	112 50	.....
John H. Foley.....	Assistant commissioner.....	19	160 00	3 38
Joseph F. Geisler.....	Chemist.....	19	72 26	50
Richard H. Lansing.....	Stenographer.....	19	14 30	.....
Samuel A. Lattimore.....	Chemist.....	19	122 50	.....
C. J. Morganstern.....	Expert and agent.....	19	80 00	39 25
M. A. Perry.....	Expert and agent.....	19	100 00	20 04
William M. Smith.....	Chemist.....	19	30 00	5 74
R. H. Palmer.....	Expert and agent.....	19	80 00	64 23
Simon Nussbaum.....	Expert and agent.....	30	100 00	11 10
Eugene Crawford.....	.....	31	40 00	.....
G. L. Flanders.....	Assistant commissioner.....	February	166 66	.....
George B. Fellows.....	Expert and agent.....	2	100 00	.....
R. D. Clark.....	Chemist.....	2	166 66	.....
J. K. Brown.....	Commissioner.....	2	250 00	.....
George L. Flanders.....	Assistant commissioner.....	7	.....	136 79
B. F. Van Valkenburgh.....	Assistant commissioner.....	13	208 33	56 15

Charles D. Olendorf.....	Attorney	"	13	40 00	.....
Arch. D. Clark	Expert and agent.....	"	13	100 00	47 90
J. J. Sorogan	Expert and agent.....	"	13	100 00	52 37
Thomas R. Gray	Expert and agent.....	"	13	100 00	58 39
William W. Meeteer.....	Expert and agent.....	"	13	100 00	60 41
Charles D. Olendorf.....	Attorney	"	13	20 00	.....
E. G. Love	Chemist	"	13	14 00	.....
Stillwell & Gladding	Chemists	"	13	95 37	2 11
Elwyn Waller.....	Chemist	"	13	100 00	.....
Joseph F. Geisler.....	Chemist	"	13	50 26	.....
E. S. Wilson.....	Expert and agent.....	"	13	100 00	66 37
James W. Walsh	Expert and agent.....	"	13	80 00	24 65
James A. Story	Expert and agent.....	"	13	27 00	16 05
James W. Mulcahy	Expert and agent.....	"	13	80 00	10 64
Frank Elliot	Expert and agent.....	"	13	75 00	33 46
Wilfred H. Sage.....	Chemist	"	13	100 00	16 40
Patrick J. Sutley	Assistant commissioner.....	"	13	166 67	93 62
C. J. Morganstern	Expert and agent.....	"	13	80 00	24 54
F. P. Vandenburg	Chemist	"	13	25 00	15 87
W. J. Corbett.....	Expert and agent.....	"	13	80 00	14 87
Peter Drexelius	Assistant commissioner.....	"	13	166 67	17 14
F. P. Vandenburg	Chemist	"	33	100 00	.....
John J. Coughlin.....	Expert and agent.....	"	13	100 00	16 69
Samuel Abrams	Expert and agent.....	"	13	100 00	9 38
Michael Galligan.....	Expert and agent.....	"	13	75 00	17 16
Marcus A. Perry	Expert and agent.....	"	13	100 00	15 16
John H. Foley	Assistant commissioner.....	"	13	150 00	9 26
McNaughton & Taylor.....	Attorneys	"	13	25 00	.....
Samuel A. Latimore	Chemist	"	13	100 00	.....
Peter H. Parker.....	Assistant commissioner.....	"	13	100 00	70 41
Charles Sears	Expert and agent.....	"	13	80 00	67 04

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DETAILED STATEMENT—(Continued).

PAYEE.	Position held.	Date of check.	Compensation.	Expenses.
John E. Cady	Expert and agent	1891. February	\$75 00	\$92 11
O. C. Griffiths	Expert and agent	"	80 00	70 71
J. H. Brown	Assistant commissioner.	"	100 00	46 12
W. B. Howard	Expert and agent.	"	75 00	17 84
Geo. W. Price	Expert and agent.	"	80 00	62 86
R. H. Palmer	Expert and agent.	"	80 00	53 44
F. D. Tutbill	Assistant commissioner.	"	150 00	28 65
T. C. Du Bois	Expert and agent.	"	100 00	89 37
M. T. Morgan	Cheese expert.	"	30 00	9 05
W. W. Hall	Cheese expert.	"	40 00	18 87
Geo. A. Smith	Cheese expert.	"	150 00	67 11
F. D. Curtis	Butter expert	"	15 00	6 96
Chas. S. Kellogg	Expert and agent.	"	24 00	
James E. Ryan	Expert and agent.	"	100 00	33 71
Charles Van Loon	Laborer	"	30 00	
R. D. Clark	Chemist	"		17 56
O. P. Stockwell	Attorney	"	125 00	38 72
O. P. Stockwell	Attorney	"	75 00	23 29
O. P. Stockwell	Attorney	"	25 00	26 00
Geo. Bernhard	Expert and agent.	"	100 00	3 05
John P. Kelly	Attorney	"	50 00	
A. S. Delano	Vinegar expert.	"	100 00	42 21
Hoffman Ruger	Vinegar expert.	"	75 00	26 94
Josiah K. Brown	Commissioner	"		11 82
Wm. Manlius Smith	Chemist	"	20 00	

Wm. G. Spence	Expert and agent.	19	39 00	3 41
James A. Story	Expert and agent.	19	12 00	9 55
Joseph F. Geisler	Chemist	19	32 00	25
J. K. Brown	Commissioner	2	250 00	
Geo. L. Flanders	Assistant commissioner.	2	166 66	
Geo. B. Fellows	Expert and agent.	2	100 00	
R. D. Clark	Chemist	2	166 66	
Simon Nussbaum	Expert and agent.	2	100 00	3 10
James E. Ryan	Expert and agent.	16	100 00	27 07
W. W. Meeteer	Expert and agent.	16	100 00	64 36
John E. Cady	Expert and agent.	16	75 00	76 72
Thomas R. Gray	Expert and agent.	16	100 00	92 85
Arthur J. Burns	Attorney	16	160 00	1 05
B. F. Van Valkenburgh	Assistant commissioner.	16	208 34	24 25
Arch D. Clark	Expert and agent.	16	100 00	51 75
J. J. Sorogan	Expert and agent.	16	100 00	53 60
E. S. Wilson	Expert and agent.	16	100 00	88 30
Hoffman Ruger	Vinegar expert.	16	75 00	4 70
Geo. A. Smith	Cheese expert.	16	150 00	82 47
A. S. Delano	Vinegar expert.	16	100 00	38 24
F. P. Vandenberg	Chemist	16	100 00	
Samuel Abrams	Expert and agent.	16	100 00	10 15
Michael Galligan	Expert and agent.	16	75 00	16 66
John J. Coughlin	Expert and agent.	16	100 00	4 92
Peter Drexelius	Assistant commissioner.	16	166 67	16 94
W. W. Hall	Cheese expert.	16	85 00	66 75
M. T. Morgan	Cheese expert.	16	100 00	66 04
Peter H. Parker	Assistant commissioner.	16	100 00	43 63
Joseph F. Geisler	Chemist	16	48 00	75
E. G. Love	Chemist	16	30 00	
Stillwell & Gladding	Chemists	16	81 00	2 70

DETAILED STATEMENT — (Continued).

PAYEE.	Poition held.	Date of check.	Compensa- tion.	Expenses.
T. C. Du Bois	Expert and agent.....	1891. March.....	\$100 00	\$40 57
George W. Price	Expert and agent.....	".....	80 00	60 21
John T. Graham	Expert and agent.....	".....	15 00	.....
R. H. Palmer	Expert and agent.....	".....	80 00	78 29
F. D. Tuthill.....	Assistant commissioner.....	".....	150 00	18 50
R. D. Clark.....	Chemist .....	".....	.....	18 61
Arthur C. Salmon.....	Attorney	".....	50 00	.....
Charles Sears.....	Expert and agent.....	".....	80 00	82 72
Frank Elliot.....	Expert and agent.....	".....	75 00	.....
James W. Mulcaey	Expert and agent.....	".....	80 00	12 52
James W. Walsh	Expert and agent.....	".....	80 00	23 60
P. J. Sutley.....	Assistant commissioner.....	".....	166 67	61 77
Wilfred H. Sage.....	Chemist	".....	100 00	.....
Charles J. Morganstern.....	Expert and agent.....	".....	80 00	25 51
Charles Van Loon.....	Laborer.....	".....	30 00	.....
George Bernhard	Expert and agent.....	".....	100 00	2 20
Samuel Lattimore.....	Chemist	".....	100 00	.....
John H. Foley.....	Assistant commissioner.....	".....	150 00	2 50
George L. Flanders	Assistant commissioner.....	".....	.....	33 23
M. A. Perry.....	Expert and agent.....	".....	100 00	9 05
W. J. Corbett.....	Expert and agent.....	".....	80 00	12 00
John M. Hutchings.....	Stenographer.....	".....	40 00	1 19
W. B. Howard.....	Expert and agent.....	".....	75 00	6 27
James H. Brown.....	Assistant commissioner.....	".....	100 00	36 53
F. P. Vandenburg	Chemist	".....	25 00	15 50

O. P. Stockwell.....	Attorney	23	100 00	11 73
O. C. Griffiths.....	Expert and agent.....	23	80 00	80 48
Lewis Cass.....	Attorney	23	25 00	.....
J. K. Brown.....	Commissioner	1	250 00	.....
Simon Nussebaum.....	Expert and agent.....	1	100 00	2 57
Geo. L. Flanders.....	Assistant commissioner.....	1	166 68	.....
Geo. B. Fellows.....	Expert and agent.....	1	100 00	.....
R. D. Clark.....	Chemist	1	166 68	.....
John M. Hutchins.....	Stenographer	1	40 00	.....
Wm. G. Spence.....	Expert and agent.....	1	60 00	.....
James E. Ryan.....	Expert and agent.....	1	100 00	25 21
George L. Flanders.....	Assistant commissioner.....	1	.....	60 00
John E. Cady.....	Expert and agent.....	16	75 00	100 92
O. C. Griffiths.....	Expert and agent.....	16	80 00	91 17
P. H. Parker.....	Assistant commissioner.....	16	100 00	84 88
Wm. M. Smith.....	Chemist	16	42 00	4 90
Harry Snyder.....	Chemist	16	18 25	.....
Munroe M. Sweetland.....	Attorney	16	15 00	.....
Arch D. Clark.....	Expert and agent.....	16	100 00	67 45
Joseph F. Geisler.....	Chemist	16	51 38	.....
Thomas R. Gray.....	Expert and agent.....	16	100 00	76 10
E. G. Love.....	Chemist	16	12 50	.....
Wm. W. Meeteer.....	Expert and agent.....	16	100 00	83 46
Arthur C. Salmon.....	Attorney	16	65 00	.....
J. J. Sorogan.....	Expert and agent.....	16	100 00	56 96
Stillwell & Gladding.....	Chemists	16	48 62	.....
B. F. Van Valkenburgh.....	Assistant commissioner.....	16	208 33	40 92
E. S. Wilson.....	Expert and agent.....	16	100 00	73 75
James H. Brown.....	Assistant commissioner.....	16	100 00	6 18
W. B. Howard.....	Expert and agent.....	16	75 00	6 10
Geo. S. Hutchinson.....	Expert and agent.....	16	3 00	91

DETAILED STATEMENT — (Continued).

PAYEE.	Position held.	Date of check.	Compensation.	Expenses.
T. C. Du Bois.....	Expert and agent.....	1891. 16	\$100 00	\$74 00
Joseph F. Geisler.....	Chemist.....	April 16	48 63	.....
R. H. Palmer.....	Expert and agent.....	" 16	80 00	49 83
Geo. W. Price.....	Expert and agent.....	" 16	80 00	65 44
F. D. Tuthill.....	Assistant commissioner.....	" 16	150 00	19 31
Geo. Bernhard.....	Expert and agent.....	" 16	100 00	6 03
John H. Foley.....	Assistant commissioner.....	" 16	150 00	9 02
S. A. Lattimore.....	Chemist.....	" 16	100 00	.....
Marcus A. Perry.....	Expert and agent.....	" 16	100 00	7 06
Frank Elliot.....	Expert and agent.....	" 16	37 50	7 89
Chas. J. Morganstern.....	Expert and agent.....	" 16	80 00	24 89
James W. Mulcaey.....	Expert and agent.....	" 16	80 00	14 37
Wilfred H. Sage.....	Chemist.....	" 16	100 00	.....
O. P. Stockwell.....	Attorney.....	" 16	75 00	19 06
Patrick J. Sutley.....	Assistant commissioner.....	" 16	166 67	53 76
F. P. Vandenburg.....	Chemist.....	" 16	25 00	17 45
James W. Walsh.....	Expert and agent.....	" 16	80 00	28 39
Samuel Abrams.....	Expert and agent.....	" 16	100 00	9 97
W. J. Corbett.....	Expert and agent.....	" 16	80 00	6 55
John J. Coughlin.....	Expert and agent.....	" 16	100 00	7 72
Peter Drexelius.....	Assistant commissioner.....	" 16	166 67	32 14
Michael Galligan.....	Expert and agent.....	" 16	75 00	17 19
W. F. Mackey.....	Attorney.....	" 16	60 00	.....
F. P. Vandenburg.....	Chemist.....	" 16	100 00	.....
Josiah K. Brown.....	Commissioner.....	" 16	.....	18 85

R. D. Clark.....	Chemist.....	"	16	.....	2 54
A. S. Delano.....	Vinegar expert.....	"	16	100 00	40 61
W. W. Hall.....	Cheese expert.....	"	16	110 00	68 01
M. T. Morgan.....	Cheese expert.....	"	16	110 00	78 81
Hoffman Ruger.....	Vinegar expert.....	"	16	75 00	18 88
George A. Smith.....	Cheese expert.....	"	16	150 00	69 71
Charles Van Loon.....	Laborer.....	"	16	30 00	.....
A. C. Wilber.....	Stenographer.....	"	16	30 00	.....
Lewis Cass.....	Attorney.....	"	22	35 00	.....
Henry J. McCormick.....	Attorney.....	"	22	15 00	.....
W. G. Spence.....	Expert and agent.....	"	22	45 00	10 87
Charles Sears.....	Expert and agent.....	"	22	80 00	82 77
Wm. Manlius Smith.....	Chemist.....	"	22	28 00	5 26
Simon Nussbaum.....	Expert and agent.....	"	30	100 00	11 10
J. K. Brown.....	Commissioner.....	May	1	250 00	.....
Geo. L. Flanders.....	Assistant commissioner.....	"	1	166 66	.....
Geo. B. Fellows.....	Expert and agent.....	"	1	100 00	.....
R. D. Clark.....	Chemist.....	"	1	166 66	.....
James E. Ryan.....	Expert and agent.....	"	2	100 00	30 71
Peter Drexelius.....	Assistant commissioner.....	"	7	166 67	15 77
Geo. L. Flanders.....	Assistant commissioner.....	"	7	.....	158 16
Peter H. Parker.....	Assistant commissioner.....	"	7	100 00	64 06
H. F. Van Valkenburgh.....	Assistant commissioner.....	"	7	208 33	57 40
Samuel Abrams.....	Expert and agent.....	"	7	100 00	11 85
Arch. D. Clark.....	Expert and agent.....	"	7	100 00	65 27
W. J. Corbett.....	Expert and agent.....	"	7	80 00	9 58
John J. Coughlin.....	Expert and agent.....	"	7	100 00	7 33
A. S. Delano.....	Vinegar expert.....	"	7	100 00	42 31
Michael Galligan.....	Expert and agent.....	"	7	75 00	22 00
W. W. Hall.....	Cheese expert.....	"	7	90 00	33 57
Wm. W. Meeteer.....	Expert and agent.....	"	7	100 00	67 13

DETAILED STATEMENT — (Continued).

PAYEE.	Position held.	Date of check.	Compensation.	Expenses.
		1891.		
M. T. Morgan.	Cheese expert.	May	\$130 00	\$63 77
Hoffman Ruger.	Vinegar expert.	"	75 00	15 10
Geo. A. Smith.	Cheese expert.	"	150 00	62 87
E. S. Wilson.	Expert and agent.	"	100 00	39 90
R. D. Clark.	Chemist.	"	.....	7 50
Joseph F. Geisler.	Chemist.	"	76 93	.....
E. G. Love.	Chemist.	"	30 00	.....
Thomas S. Gladding.	Chemist.	"	85 00	1 50
F. P. Vandenburg.	Chemist.	"	100 00	.....
La Roy S. Gove.	Attorney.	"	30 00	.....
Chas. D. Olendorf.	Attorney.	"	60 00	.....
John M. Hutchings.	Stenographer.	"	40 00	.....
A. C. Wilbur.	Stenographer.	"	33 33	.....
R. H. Palmer.	Expert and agent.	"	80 00	55 93
Risley & Perry.	Attorneys.	"	305 00	48 50
James H. Brown.	Assistant commissioner.	"	100 00	48 35
John H. Foley.	Assistant commissioner.	"	150 00	19 35
Patrick J. Sutley.	Assistant commissioner.	"	166 67	48 71
F. D. Tuthill.	Assistant commissioner.	"	150 00	16 25
Geo. Bernhard.	Expert and agent.	"	100 00	7 44
John E. Cady.	Expert and agent.	"	75 00	97 66
F. D. Curtis.	Butter expert.	"	40 00	11 27
T. C. Dubois.	Expert and agent.	"	100 00	67 25
Thomas R. Gray.	Expert and agent.	"	100 00	40 45
O. C. Griffin.	Expert and agent.	"	80 00	75 01

W. B. Howard	Expert and agent.	20	75 00	7 05
Geo. S. Hutchinson	Expert and agent.	20	18 00	16 20
Chas. J. Morganstern	Expert and agent.	20	80 00	20 30
James W. Mulcay	Expert and agent.	20	80 00	19 17
Marcus A. Perry	Expert and agent.	20	100 00	8 50
George W. Price	Expert and agent.	20	80 00	82 05
Charles Sears.	Expert and agent.	20	80 00	46 92
J. J. Sorogan	Expert and agent.	20	100 00	55 46
W. G. Spence	Expert and agent.	20	51 00	19 71
James W. Walsh	Expert and agent.	20	80 00	32 05
Joseph F. Geisler	Chemist	20	24 00	3 75
Samuel A. Lattimore	Chemist	20	100 00	.....
Wilfred H. Sage	Chemist	20	100 00	.....
Stillwell & Gladding	Chemists	20	.....	16 50
William Manlius Smith	Chemist	20	7 00	.....
Harry Snyder	Chemist	20	31 00	1 25
McNaughton & Taylor	Attorneys	20	50 00	3 75
O. P. Stockwell	Attorney	20	.....	10 04
Charles Van Loon	Laborer	20	30 00	.....
Josiah K. Brown	Commissioner	29	250 00	.....
George L. Flanders	Assistant commissioner.	29	166 66	.....
George B. Fellows	Expert and agent.	29	100 00	.....
R. D. Clark	Chemist	29	166 66	.....
George L. Flanders	Assistant commissioner.	June	.....	202 98
James H. Brown	Assistant commissioner.	9	100 00	20 57
James W. McMahon	Assistant commissioner.	10	166 66	51 57
Peter Drexelius	Assistant commissioner.	10	166 67	25 73
Peter H. Parker	Assistant commissioner.	10	100 00	82 71
Patrick J. Sutley	Assistant commissioner.	10	166 67	61 46
F. D. Tuthill	Assistant commissioner.	10	150 00	21 90
B. F. Van Valkenburgh	Assistant commissioner.	10	208 33	31 15

DETAILED STATEMENT — (Continued).

PAYEE.	Position held.	Date of check.	Compensation.	Expenses.
		1891.		
Samuel Abrams	Expert and agent	June	\$100 00	\$9 59
John E. Cady	Expert and agent	"	75 00	95 61
Arch. D. Clark	Expert and agent	"	100 00	84 95
John J. Coughlin	Expert and agent	"	100 00	9 60
W. J. Corbett	Expert and agent	"	80 00	15 20
A. S. Delano	Vinegar expert	"	100 00	62 69
T. C. Du Bois	Expert and agent	"	100 00	62 72
Michael Galligan	Expert and agent	"	75 00	15 85
T. R. Gray	Expert and agent	"	100 00	37 00
O. C. Griffin	Expert and agent	"	80 00	80 17
W. B. Howard	Expert and agent	"	75 00	14 38
W. W. Hall	Cheese expert	"	130 00	74 70
Charles S. Kellogg	Expert and agent	"	75 00	61 30
William W. Meeteer	Expert and agent	"	100 00	39 57
M. T. Morgan	Cheese expert	"	125 00	68 92
Charles J. Morganstern	Expert and agent	"	80 00	18 71
George W. Price	Expert and agent	"	80 00	63 61
James E. Ryan	Expert and agent	"	100 00	24 19
Hoffman Ruger	Vinegar expert	"	75 00	42 16
Charles Sears	Expert and agent	"	80 00	75 66
George A. Smith	Cheese expert	"	150 00	69 59
J. J. Sorogan	Expert and agent	"	100 00	22 01
W. G. Spence	Expert and agent	"	51 00	10 51
James W. Walsh	Expert and agent	"	80 00	41 59
E. S. Wilson	Expert and agent	"	100 00	37 80

R. D. Clark.....	Chemist	10	65 50	6 97
Joseph F. Geisler.....	Chemist	10	36 25	
E. G. Love.....	Chemist	10	100 00	
Wilfred H. Sage.....	Chemists	10	67 00	
Stillwell & Gladding.....	Chemist	10	10 00	
William Manlius Smith.....	Chemist	10	7 50	
Harry Snyder.....	Chemist	10	100 00	
F. P. Vandenburg.....	Attorney	10	30 00	4 79
Lewis Cass.....	Attorney	10	30 00	
La Roy S. Gove.....	Attorney	10	60 00	
F. V. S. Oliver.....	Attorney	10	90 50	
Arthur C. Salmon.....	Stenographer	10	40 00	2 11
John M. Hutchings.....	Laborer	10	30 00	
Charles Van Loon.....	Assistant commissioner	18	150 00	2 00
John H. Foley.....	Chemist	18	160 00	17 99
Samuel A. Lattimore.....	Expert and agent	18	100 00	6 91
George Bernhard.....	Expert and agent	18	6 00	2 32
George S. Hutchinson.....	Expert and agent	18	80 00	42 79
R. H. Palmer.....	Expert and agent	18	100 00	42 39
M. A. Perry.....	Chemist	20	65	43 00
Joseph F. Geisler.....	Commissioner	July	250 00	
Josiah K. Brown.....	Assistant commissioner	"	166 68	
George L. Flanders.....	Expert and agent	"	100 00	
George B. Fellows.....	Chemist	"	166 68	
R. D. Clark.....	Expert and agent	"	100 00	7 05
Simon Nussbaum.....	Stenographer	"	40 00	
John M. Hutchings.....	Assistant commissioner	"	100 00	23 88
James H. Brown.....	Assistant commissioner	"	166 67	6 95
Peter Drexellus.....	Assistant commissioner	"		69 93
George L. Flanders.....	Assistant commissioner	"	166 66	48 43
James W. McMahon.....	Assistant commissioner	"		

DETAILED STATEMENT — (Continued).

PAYEE.	Position held.	Date of check.	Compensation.	Expenses.
Peter H. Parker	Assistant commissioner.....	1891. July	\$100 00	\$93 08
P. J. Sutley	Assistant commissioner.....	"	166 67	61 42
F. D. Tutbill	Assistant commissioner.....	"	150 00	23 63
B. F. Van Valkenburgh	Assistant commissioner.....	"	208 33	26 91
Samuel Abrams	Expert and agent.....	"	100 00	11 55
Grove Barnum	Expert and agent.....	"	80 00	40 04
John E. Cady	Expert and agent.....	"	75 00	95 31
Arch. D. Clark	Expert and agent.....	"	100 00	40 18
W. J. Corbett	Expert and agent.....	"	80 00	15 35
J. J. Coughlin	Expert and agent.....	"	100 00	12 20
D. C. Curtis	Cheese expert.....	"	50 00	.....
Robert Dalzell	Expert and agent.....	"	51 00	36 20
A. S. Delano	Vinegar expert.....	"	100 00	51 76
T. C. Du Bois	Expert and agent.....	"	100 00	63 37
Frank Elliott	Expert and agent.....	"	75 00	19 43
Michael Galligan	Expert and agent.....	"	75 00	20 74
T. R. Gray	Expert and agent.....	"	100 00	39 15
W. W. Hall	Cheese expert.....	"	110 00	74 13
Daniel P. McMahon	Expert and agent.....	"	33 00	13 92
W. W. Meeteer	Expert and agent.....	"	100 00	41 95
M. T. Morgan	Cheese expert.....	"	130 00	93 59
C. J. Morganstern	Expert and agent.....	"	80 00	38 90
R. H. Palmer	Expert and agent.....	"	80 00	77 91
George W. Price	Expert and agent.....	"	80 00	65 34
Hoffman Ruger	Vinegar expert.....	"	75 00	4 43
James E. Ryan	Expert and agent.....	"	100 00	15 59

Charles Sears.....	Expert and agent.....	"	9	80 00	77 90
George A. Smith.....	Cheese expert.....	"	9	150 00	66 51
J. J. Sorogan.....	Expert and agent.....	"	9	100 00	42 90
James A. Story.....	Expert and agent.....	"	9	36 00	66 49
W. G. Spence.....	Expert and agent.....	"	9	90 00	54 13
E. S. Wilson.....	Expert and agent.....	"	9	100 00	40 60
R. D. Clark.....	Chemist.....	"	9	.....	24 16
Joseph F. Geisler.....	Chemist.....	"	9	95 25	5 33
Wilfred H. Sage.....	Chemist.....	"	9	100 00	16 00
William Manlius Smith.....	Chemist.....	"	9	30 00	60
Harry Snyder.....	Chemist.....	"	9	7 00	50
Stillwell & Gladding.....	Chemists.....	"	9	56 25	75
F. P. Vandenburg.....	Chemist.....	"	9	100 00	.....
La Roy S. Gove.....	Attorney.....	"	9	50 00	.....
William F. Mackey.....	Attorney.....	"	9	30 00	.....
Charles D. Olendorf.....	Attorney.....	"	9	170 00	.....
Arthur C. Salmon.....	Attorney.....	"	9	30 00	.....
A. C. Wilbur.....	Stenographer.....	"	9	10 00	.....
Charles Van Loon.....	Laborer.....	"	9	30 00	.....
John H. Foley.....	Assistant commissioner.....	"	9	150 00	6 00
George Bernhard.....	Expert and agent.....	"	9	100 00	12 20
O. C. Griffis.....	Expert and agent.....	"	9	80 00	79 72
Marcus A. Perry.....	Expert and agent.....	"	9	100 00	18 06
Samuel A. Lattimore.....	Chemist.....	"	9	100 00	.....
McNaughton & Taylor.....	Attorneys.....	"	9	25 00	.....
Charles Burke.....	Expert and agent.....	"	15	80 00	11 70
W. B. Howard.....	Expert and agent.....	"	15	75 00	20 28
Charles S. Kellogg.....	Expert and agent.....	"	15	78 00	82 61
James W. Walsh.....	Expert and agent.....	"	15	80 00	55 99
O. P. Stockwell.....	Attorney.....	"	15	25 00	11 25
Josiah K. Brown.....	Commissioner.....	"	23	.....	150 40

DETAILED STATEMENT — (Continued).

PAYEE.	Position held.	Date of check.	Compensation.	Expenses.
Josiah K. Brown.	Commissioner.	1891. August	\$250 00	.....
George L. Flanders	Assistant commissioner.	"	166 66	.....
George B. Fellows.	Assistant commissioner.	"	100 00	.....
R. D. Clark.	Chemist	"	166 66	.....
Simon M. Nussbaum	Expert and agent.	"	100 00	\$12 45
John M. Hutchins	Stenographer	"	40 00	.....
P. J. Sutley.	Assistant commissioner.	"	166 67	77 25
L. E. Srafford	Expert and agent.	"	60 00	16 46
R. H. Palmer.	Expert and agent.	"	80 00	57 84
J. H. Brown.	Assistant commissioner.	"	100 00	20 47
George L. Flanders	Assistant commissioner.	"	.....	192 27
James W. McMahon	Assistant commissioner.	"	166 66	39 11
P. H. Parker.	Assistant commissioner.	"	100 00	89 67
F. D. Tuthill.	Assistant commissioner.	"	150 00	27 95
B. F. Van Valkenburgh	Assistant commissioner.	"	208 33	43 99
George J. Zillig	Assistant commissioner.	"	166 66	10 04
Samuel Abrams	Expert and agent.	"	100 00	14 58
Charles Burke.	Expert and agent.	"	80 00	22 21
John E. Cady	Expert and agent.	"	75 00	94 38
Arch. D. Clark.	Expert and agent.	"	100 00	45 31
W. J. Corbett.	Expert and agent.	"	80 00	31 56
John J. Coughlin.	Expert and agent.	"	100 00	15 29
A. S. Delano	Vinegar expert.	"	100 00	48 06
T. C. DuBois.	Expert and agent.	"	100 00	82 25
Michael Galligan	Expert and agent.	"	75 00	27 22

T. R. Gray	Expert and agent	7	100 00	60 44
O. C. Griffith	Expert and agent	7	80 00	80 02
W. W. Hall	Cheese expert	7	135 00	98 78
W. B. Howard	Expert and agent	7	75 00	14 84
Charles S. Kellogg	Expert and agent	7	81 00	88 84
W. W. Meeteer	Expert and agent	7	100 00	66 16
M. T. Morgan	Cheese expert	7	135 00	98 33
Charles J. Morganstern	Expert and agent	7	80 00	42 62
Hoffman Ruger	Vinegar expert	7	75 00	9 77
Charles Sears	Expert and agent	7	80 00	78 32
George A. Smith	Cheese expert	7	150 00	56 79
W. G. Spence	Expert and agent	7	93 00	58 05
J. J. Sorogan	Expert and agent	7	100 00	67 62
James A. Story	Expert and agent	7	3 00	4 36
Robert C. Turner	Expert and agent	7	100 00	2 50
James W. Walsh	Expert and agent	7	80 00	51 34
E. S. Wilson	Expert and agent	7	100 00	53 38
R. D. Clark	Chemist	7	50 00	37 66
Joseph F. Geisler	Chemist	7	254 01	15 10
E. G. Love	Chemist	7	23 00	.....
W. E. McDuffie	Chemist	7	100 00	22 35
Stillwell & Gladding	Chemists	7	94 75	.....
F. P. Vandenburgh	Chemists	7	100 00	2 00
Armstrong & Wieher	Attorneys	7	90 00	.....
Benj. W. Downing	Attorney	7	120 00	.....
G. B. D. Hasbrouck	Attorney	7	35 00	.....
A. C. Salmon	Attorney	7	25 00	.....
O. P. Stockwell	Attorney	7	100 00	28 84
Wilkinson & Cossun	Attorneys	7	20 00	.....
Charles Van Loon	Laborer	7	30 00	.....
Stillwell & Gladding	Chemists	7	8 25	.....

DETAILED STATEMENT — (Continued).

PAYEE.	Position held.	Date of check.	Compensation.	Expenses.
John H. Foley	Assistant commissioner.....	1891. August 14	\$150 00	.....
Wm. Manlius Smith.....	Chemist	" 14	8 00	\$20 00
William Vanamee	Attorney	" 14	25 00	.....
Grove Barnum	Expert and agent.....	" 14	80 00	39 14
George Bernhard	Expert and agent.....	" 14	100 00	33 45
Frank E. Geise	Expert and agent.....	" 14	55 70	7 14
Marcus A. Perry	Expert and agent.....	" 14	100 00	35 73
Josiah K. Brown.....	Commissioner	" 26	250 00	.....
George L. Flanders	Assistant commissioner.....	" 27	166 66	.....
George B. Fellows.....	Expert and agent.....	" 27	100 00	.....
R. D. Clark.....	Chemist	" 27	166 66	.....
Simon Nusbaum	Expert and agent.....	" 31	100 00	30 83
John M. Hutchings	Stenographer	" 31	40 00	7 34
Josiah K. Brown	Commissioner	" 31	.....	48 26
George W. Price	Expert and agent.....	September 1	80 00	62 37
James H. Brown	Assistant commissioner.....	" 10	100 00	28 57
John H. Foley.....	Assistant commissioner.....	" 10	150 00	.....
James W. McMahon	Assistant commissioner.....	" 10	166 66	71 56
Peter H. Parker	Assistant commissioner.....	" 10	100 00	87 07
Patrick J. Sutley	Assistant commissioner.....	" 10	166 67	35 29
F. D. Tuthill.....	Assistant commissioner.....	" 10	150 00	23 25
B. F. Van Valkenburgh	Assistant commissioner.....	" 10	208 33	87 08
George J. Zillig	Assistant commissioner.....	" 10	166 66	25 58
Samuel Abrams	Expert and agent.....	" 10	100 00	16 35
Grove Barnum	Expert and agent.....	" 10	80 00	29 00

George Bernhard	Expert and agent	"	10	100 00	18 02
Charles Burke	Expert and agent	"	10	80 00	49 47
Thomas Byrnes	Expert and agent	"	10	45 00	48 20
Thomas Byrnes	Expert and agent	"	10	75 00	76 27
John E. Cady	Expert and agent	"	10	75 00	98 82
Arch D. Clark	Expert and agent	"	10	100 00	73 88
W. J. Corbett	Expert and agent	"	10	80 00	26 59
John J. Coughlin	Expert and agent	"	10	100 00	19 74
Robert Dalzell	Expert and agent	"	10	81 00	68 45
Robert Dalzell	Expert and agent	"	10	78 00	71 25
A. S. Delano	Vinegar expert	"	10	100 00	42 56
T. C. Du Bois	Expert and agent	"	10	100 00	54 11
M. Galligan	Expert and agent	"	10	75 00	25 38
Frank E. Geise	Expert and agent	"	10	90 00	19 93
T. R. Gray	Expert and agent	"	10	100 00	68 20
O. C. Griffin	Expert and agent	"	10	80 00	81 62
W. W. Hall	Cheese expert	"	10	130 00	110 39
Charles S. Kellogg	Expert and agent	"	10	78 00	84 31
Wm. W. Meeteer	Expert and agent	"	10	100 00	86 64
M. T. Morgan	Cheese expert	"	10	130 00	105 72
Chas. J. Morganstern	Expert and agent	"	10	80 00	19 86
Wm. T. Peaslee	Expert and agent	"	10	78 00	30 95
Marcus A. Perry	Expert and agent	"	10	100 00	29 79
George W. Price	Expert and agent	"	10	80 00	66 82
Joseph M. Quigley	Expert and agent	"	10	100 00	9 66
H. A. Rees	Expert and agent	"	10	48 00	24 00
H. A. Rees	Expert and agent	"	10	78 00	60 12
Hoffman Ruger	Vinegar expert	"	10	75 00	19 76
L. E. Scafford	Expert and agent	"	10	75 00	44 35
Charles Sears	Expert and agent	"	10	80 00	73 21
George A. Smith	Cheese expert	"	10	150 00	54 79

DETAILED STATEMENT — (Concluded).

PAYEE.	Position held.	Date of check.	Compensation.	Expenses.
W. G. Spence	Expert and agent.	1891. September	\$93 00	\$54 88
J. J. Sorogan	Expert and agent.	"	100 00	54 90
George P. Taylor	Expert and agent.	"	81 00	42 08
M. P. Toomey	Expert and agent.	"	78 00	40 62
M. P. Toomey	Expert and agent.	"	78 00	23 71
R. C. Turner	Expert and agent.	"	100 00	19 50
James W. Walsh	Expert and agent.	"	80 00	53 34
E. S. Wilson	Expert and agent.	"	100 00	61 84
R. D. Clark	Chemist	"	50 00	50 02
Theodore Deecke	Chemist	"	95 00	9 65
Joseph F. Geisler	Chemist	"	92 22	1 00
Samuel A. Lattimore	Chemist	"	140 00	.....
Samuel A. Lattimore	Chemist	"	100 00	.....
E. G. Love	Chemist	"	24 00	.....
E. G. Love	Chemist	"	10 00	.....
R. McDuffie	Chemist	"	100 00	35 97
Stillwell & Gladding	Chemists	"	7 50	98
William Manlius Smith	Chemist	"	18 00	40
William Manlius Smith	Chemist	"	18 00	40
F. P. Vandenburg	Chemist	"	100 00	.....
Armstrong & Witcher	Attorneys	"	30 00	.....
Charles Van Loon	Laborer	"	30 00	.....
George L. Flanders	Assistant commissioner	"	.....	201 43
W. B. Howard	Expert and agent	"	75 00	77 20
R. H. Palmer	Expert and agent	"	80 00	86 98
Theodore Deecke	Chemist	"	30 00	.....

Joseph F. Geisler	Chemist	"	18	45 15	15
Stillwell & Gladding	Chemists	"	18	44 20	4 25
J. K. Brown	Commissioner	"	28	250 00	.....
George L. Flanders	Assistant commissioner	"	28	166 68	.....
George B. Fellows	Expert and agent	"	28	100 00	.....
R. D. Clark	Chemist	"	28	166 68	.....
Lewis Cass	Attorney	"	30	25 00	.....
Simon Nussbaum	Expert and agent	"	30	100 00	23 36
George B. Fellows	Expert and agent	"	30	.....	17 24
John M. Hutchings	Stenographer	"	30	40 00	1 43

At the time of the formation of this department, in 1884, there was no other State in the Union that had a dairy or dairy and food commission and laws against the imitation or adulteration of dairy products, except Louisiana, which had a law relative to oleomargarine; the contests existing in that State at that time over the question of the constitutionality of the law, created considerable excitement. The Legislature of this State at that time passed an act known as the oleomargarine law (chapter 202 Laws 1884) and thereby created a Dairy Commission.

Since that time the following States have created dairy or dairy and food commissions: Colorado, Connecticut, Iowa, Minnesota, New Jersey, Ohio, Oregon and Wisconsin, to say nothing of the Dairy Commission of the Dominion of Canada. Seven States of the Union now have a standard for milk; they are as follows:

STANDARDS FOR QUALITY OF MILK.

Massachusetts.

	Per cent.
Water	87
Total solids	13
Solids exclusive of fats	9.3

Michigan.

	Per cent.
Water	87.50
Total solids	12.50
Fats	3

Specific gravity, from 1.029 to 1.033.

Skimmed milk, specific gravity at sixty degrees F., 1.032 to 1.037.

Minnesota.

	Per cent.
Water	87
Solids	13
Fat	3.5

New Jersey.

	Per cent.
Water	88
Solids	12

New York.

	Per cent.
Water	88
Total solids	12
Fats	3

Vermont.

	Per cent.
Total solids	12.5
Solids, exclusive of fat	9.25

In May and June twelve per cent solids only.

Wisconsin.

	Per cent.
Pure butter fats	3

The annual manufacture of oleomargarine, at the time of the creation of the Dairy Commission of the State of New York, was estimated at a hundred millions of pounds, whereas the estimates of the year 1891 is 43,000,000 pounds.

It is generally conceded in this State, by people who know, and denied by no one that I am aware of, that pure milk is now the rule in the state of New York and impure milk the exception, whereas, prior to the existence of this department, the reverse of this proposition was true.

It would seem from a general view that the sentiment of the people is along the line of pure products, and the States, one by one, slowly but surely, are falling into the lines of those views and providing means to obtain such results. While New York State has been the pioneer in nearly every movement of this kind Minnesota has taken a step in advance of this State in one respect; she has established a standard for cheese, requiring that the percentage of fat, in full-cream cheese, shall be forty per cent of the total solids. The Legislature of that State created this standard upon the recommendation of the State Dairy Commissioner of Minnesota and the State Dairyman's Association.

Whether their example should be followed in this respect is a question that I will not discuss here. I will content myself with submitting the proposition that, on the whole, the progress in these matters is in the right direction, being along the line of honest products and in the interest of the consuming public directly, and incidentally in the interest of the honest producers.

J. K. BROWN,

New York State Dairy Commissioner.

APPENDIX.

In the appendix to this report will be found the reports of the assistant commissioners as follows:

For the second division, report of B. F. Van Valkenburgh.

For the third division, report of F. D. Tuthill.

For the fourth division, report of P. J. Sutley.

For the fifth division, report of J. H. Brown.

For the seventh division, report of P. H. Parker.

For the eighth division, report of John H. Foley.

For the ninth division, report of Geo. Zillig.

For the tenth division, report of James W. McMahon.

Also, report of Cheese Instructor Geo. A. Smith.

Also, report of Cheese Instructor W. W. Hall.

Also, report of Cheese Instructor M. T. Morgan,

And the report of Dr. R. D. Clark, department chemist.



Report of B. F. Van Valkenburgh.

Hon. JOSIAH K. BROWN, *New York State Dairy Commissioner* :

Sir.—I have the honor to submit this, my eighth annual report, as assistant commissioner, giving in detail the work performed in the second division of the dairy department during the year ended September 30, 1891.

The work in this division of the department has progressed on the usual line and nothing of special interest has occurred, except that the manufacturers of oleomargarine in the eastern and western States have made greater exertion during the past year to again introduce their goods, claiming that they were protected by the United States courts under the original package decision. Their agents have made strenuous efforts to induce retail butter dealers to handle their goods, but have met with very little success, the dealers being aware, from former experience, that the State dairy experts were on the alert and that they were liable to be discovered with the goods in their possession, should they attempt to handle them. At the same time, the manufacturers have, through their agents, continued to canvass during the entire year, assuming that they were protected under the original package decision against prosecution. They have used every argument that ingenuity could devise to induce citizens of the State of New York to violate the laws but they have succeeded in persuading only six butter dealers in this division to take the risk of handling their goods. These parties were soon discovered and were prosecuted, a detailed statement of which will appear later in this report. The agents of the manufacturers of oleomargarine have met with a little better success in inducing hotel and restaurant-keepers to serve their goods upon their tables, eleven of whom were detected and prosecuted, a detailed report of which will also appear.

I have kept the employes of the Dairy Commission continually on the ground, watching every avenue through which oleomargarine could be distributed and following it to its destination whenever discovered at the different railroad depots, steamboat landings and express offices. I have found the plan of watching the routes over which these adulterated goods must arrive, in order to be distributed within the State, and following them to their destination a much cheaper and better plan than to go from store to store inspecting, and from one hotel or restaurant to another, sampling the butter or imitation of the same on their tables.

The work done during the year demonstrates that but a small quantity of spurious goods have been shipped into the State during that period, as will be seen in the report of cases prosecuted submitted herewith, showing that only seventeen have been discovered using or selling these imitations of butter in violation of the law during the year.

There has been but one license to sell oleomargarine issued by the United States authorities in this division of the department during the past year; this license was issued in March last to Messrs. Armour & Co. of Chicago, Illinois, who have a branch house in the city of New York. Very soon after they obtained a license, they caused one of their employes, Henry Raphael, to be arrested. The prosecution was brought by W. L. Mitchell, who charged said Henry Raphael with selling oleomargarine in violation of the State law, evidently with the intention of testing the original package question. The attorneys for Armour & Co. called upon and requested me, as representative of the Dairy Commission, to assume control of the prosecution of the above case; this I refused to do until I could confer with you. After consulting with you it was decided to have one of the attorneys for the Dairy Commission examine into the matter. He, after learning all of the facts in the case, came to the conclusion that it was not a proper case for the Dairy Commission to prosecute, as it was evidently a collusive case and one in which no point of material interest could be determined. Very

soon thereafter the case was discontinued. The following statistics, taken in part from my last annual report, show the amount of oleomargarine consumed in the United States during the last six years. The great increase in the amount consumed during the year ending June 30, 1891, is no doubt in part caused by the higher price of butter during that year, but mainly owing to the original package decision, which has encouraged the manufacturers and dealers in oleomargarine and given them greater facilities to evade prosecution under State laws. Still, it has had but little effect in the State of New York as the manufacturers do not seem to want to raise the original package question in this State, in a way to fairly test the same.

Very soon after the case commenced by Armour & Co. was discontinued, I attempted to make such a case against them as would fairly raise the important questions, but after repeated efforts to purchase oleomargarine from their New York firm, both openly and surreptitiously, I failed to purchase the goods in any manner. The representative of the firm saying that they would not sell as it would in all probability get both the purchaser and themselves into trouble under the State law. This shows that while Armour & Co. were not willing to sell oleomargarine openly, that they were willing to sell it through their agents, which they have succeeded in doing to a slight extent, in fact, the quantity that they have succeeded in introducing into the State has not equalled one package of oleomargarine to every one thousand packages of butter consumed. But, should the force under the Dairy Commission, for any reason, be withdrawn from duty, the cities and country towns would be flooded with these fraudulent goods within one month after it was known that that force was not on active duty.

The following table compiled from the statement of the manufacturers referred to for 1886 and the reports of the commissioners of internal revenue, show the amount manufactured and sold during the past six years, to wit:

	Pounds.
Manufacturers' estimate for the year ending June 30,	
1886	100,000,000

	Pounds.
June 30, 1886, to November 1, 1886, estimated at. . . .	3,305,376
Eight months internal revenue report to June 30, 1887	21,694,624
	<hr/>
For the year ending June 30, 1887.....	25,000,000
	<hr/> <hr/>
For the year ending June 30, 1888, revenue report..	34,325,527
For the year ending June 30, 1889, revenue report..	35,664,026
For the year ending June 30, 1890, revenue report..	30,960,286
For the year ending June 30, 1891, revenue report..	43,215,512
	<hr/> <hr/>

The following statistics, taken from my last annual report, showing the amount of butter handled in New York do not show any increase during the years ending November 1, 1885, 1886 and 1887, but show that about the same amount was received each year, which is accounted for by the fact that oleomargarine was formerly shipped by the manufacturers and dealers as butter, and entered into the statistics as such, there being no way to separate the two. In addition to the oleomargarine received from other States, and included in the figures hereinafter given, there was a large quantity made in the city and State of New York, previous to 1886, not included in these figures, therefore, the increased production of butter for the New York market within the past five years has equaled the amount of oleomargarine formerly consumed, and has also supplied the increase of population with butter.

The following statistics, showing the number of pounds and value of butter received in New York city, yearly, from 1882 to 1889, inclusive, copied from my last annual report, may be of interest as showing the decline from 1882 to 1885, and the advance from 1885 to 1888, and for comparison with the receipts and value of the product handled during the years ending October 31, 1889 and 1890.

The receipts and value of butter handled in New York city for nine years, ending November 30, 1890, were as follows:

FOR THE YEAR ENDING NOVEMBER 30, 1882.

Eastern, 44,215,990 pounds, valued at twenty-nine and one-half cents per pound.....	\$13,043,617 05
Western, 35,648,850 pounds, valued at twenty-eight cents per pound.....	9,981,678 00
Total, 79,864,840 pounds	<u>\$23,025,295 05</u>

FOR THE YEAR ENDING NOVEMBER 30, 1883.

Eastern, 44,804,060 pounds, valued at twenty-six cents per pound	\$11,649,055 60
Western, 45,743,850 pounds, valued at twenty-four cents per pound	10,978,524 00
Total, 90,547,910 pounds	<u>\$22,627,579 60</u>

FOR THE YEAR ENDING NOVEMBER 30, 1884.

Eastern, 38,263,820 pounds, valued at twenty-four and one-half cents per pound	\$9,374,635 90
Western, 49,853,350 pounds, valued at twenty-two cents per pound	10,967,737 00
Total, 88,117,170 pounds	<u>\$20,342,372 90</u>

FOR THE YEAR ENDING OCTOBER 31, 1885.

Eastern, 39,480,350 pounds, valued at twenty-two cents per pound	\$8,685,677 00
Western, 54,086,500 pounds, valued at twenty cents per pound	10,817,300 00
Total, 93,566,850 pounds	<u>\$19,502,977 00</u>

These figures show, by comparing 1885 with 1882, that the receipts for 1885 were 13,702,010 pounds in excess of 1882, but the marketable value was \$3,522,313.05 less. In order to show the real difference, take the receipts of 1885, 93,566,850 pounds, and value, eastern at twenty-nine and one-half cents and western at twenty-eight cents, the same as the prices of 1882, and we would have a total of \$26,790,923.25. Deduct the actual value of 1885,

\$19,502,977, showing a loss on amount handled thus compared of \$7,287,496.25, by shrinkage in value in the four years.

The receipts and value of butter handled in New York city, for the year ending October 31, 1886, were as follows:

Eastern, 38,985,520 pounds, valued at twenty-three and a half cents per pound.....	\$9,161,597 20
Western, 54,716,000 pounds, valued at twenty-one and a half cents per pound.....	11,763,940 00
Total, 93,701,520 pounds	\$20,925,537 20
Deduct value of product handled in 1885.....	19,502,977 00
Net gain in 1886 over 1885.....	\$1,422,560 20

Total value of milk and cream handled in New York for the year ending October 31, 1886	\$8,160,750 00
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The receipts and value of butter, milk and cream for the year ending October 31, 1887, were as follows:

BUTTER.

Eastern, 37,062,130 pounds, valued at twenty-four cents per pound	\$8,894,911 90
Western, 56,650,350 pounds, valued at twenty-two cents per pound	12,463,077 00
Total, 93,712,480 pounds, valued at.....	\$21,357,988 20
Value of milk and cream	9,499,900 00
Total	\$30,857,888 20
Deduct value of butter, milk and cream handled in 1886	29,086,287 20
Net gain in 1887 over 1886	\$1,771,601 00
Add net gain in cheese of 1887 over 1886.....	687,843 00
Total net gain on butter, cheese, milk and cream handled in New York in 1887 over 1886	\$2,459,444 00

The receipts and value of dairy products handled in New York city during the year ending October 31, 1888, were as follows:

BUTTER.

Eastern, 31,784,410 pounds, valued at twenty-four and one-half cents per pound	\$7,787,180 45
Western, 63,457,950 pounds, valued at twenty-two and one-half cents per pound	14,278,038 75
Total value of butter handled	<u>\$22,065,219 20</u>

CHEESE.

Eastern, 98,877,955 pounds, valued at ten and one- half cents per pound	\$10,382,185 27
Western, 3,637,260 pounds, valued at eight and one-half cents per pound	309,167 10
In transit for export, 7,636,850 pounds, valued at ten cents per pound	763,685 00
Total, 110,152,065 pounds, valued at.....	<u>\$11,455,037 37</u>

MILK.

Crude, gallons	58,678,390
Cream, gallons	1,191,940
Condensed milk, gallons, pearl.....	751,830
Total (valued at \$9,652,500), gallons.....	<u>60,622,160</u>

Total value of butter handled.....	\$22,065,219 20
Total value of cheese handled.....	11,455,037 37
Total value of milk and cream handled.....	<u>9,652,500 00</u>
Total	\$43,172,756 57
Deduct total value of dairy product handled in 1887	<u>43,047,771 02</u>
Net gain in 1888 over 1887.....	<u>\$124,985 55</u>

The gain in value over 1887 is light, for the reason that the average price of cheese has been one cent per pound lower than in 1887, although butter averaged one-half cent higher.

The receipts and value of dairy products handled in New York city during the year ending October 31, 1889, were as follows:

BUTTER.

Eastern, 30,626,610 pounds, valued at twenty-three cents per pound.....	\$7,044,129 30
Western, 77,820,650 pounds, valued at twenty-one cents per pound.....	16,342,336 50
Total, 108,447,260 pounds, valued at.....	<u>\$23,386,466 80</u>

CHEESE.

Eastern, 101,712,655 pounds, valued at ten cents per pound	\$10,171,265 50
Western, 3,660,120 pounds, valued at nine cents per pound	329,410 80
Total, 105,372,775 pounds, valued at.....	<u>\$10,500,676 30</u>

MILK.

Six million four hundred and twenty-one thousand three hundred and eighty-seven cans of crude milk of ten gallons.....	64,213,870
Seventy-six thousand six hundred and seven cans unsweetened condensed milk of ten gallons	766,070
One hundred and thirty-two thousand two hundred and eighty-four cans of cream of ten gallons	1,322,840
Total gallons	<u>66,302,780</u>
Valued at	<u>\$9,500,500 00</u>

According to the estimate of those best informed on the subject, there have been 1,500,000 forty-quart cans of milk produced within the State of New York during the year, reported sold to condensers, most of which reaches this market in a condensed form

in small cans, valued in the crude state at \$2,175,000, making a total of \$11,675,000.

Total value of butter handled.....	\$23,386,456 80
Total value of cheese handled.....	10,500,676 30
Total value of milk, cream and condensed milk handled	11,675,500 00
Total	\$45,562,633 10
Deduct total value of dairy product handled in 1888	43,172,756 51
Net gain in 1889 over 1888 is.....	\$2,389,876 59
Less value of condensed milk in small cans, 1888	2,175,000 00
Total	\$214,876 59

The receipts of eastern butter for the year ending October 31, 1889, were 1,157,800 pounds less than in the previous year, while the amount of cheese received was 2,834,700 pounds in excess of 1888, showing that just about the same amount of product of the dairy in butter and cheese from the State of New York has been marketed as in the previous year.

The receipts and value of dairy products handled in New York city during the year ending October 31, 1890, were as follows:

BUTTER.

Eastern, 26,560,660 pounds, valued at twenty cents per pound	\$5,312,132 00
Western, 71,094,500 pounds, valued at eighteen cents per pound	12,797,010 00
Total, 97,655,160 pounds, valued at.....	\$18,109,142 00

CHEESE.

Eastern, 102,118,115 pounds, valued at nine and three-fourths cents per pound	\$9,956,526 22
Western, 3,483,090 pounds, valued at eight cents per pound	278,647 20
Total, 105,601,205 pounds, valued at	\$10,235,173 42

MILK.

Six million two hundred and eighty-five thousand two hundred and ninety-four cans crude milk of ten gallons each	62,852,940
Sixty-nine thousand three hundred and sixty-seven cans unsweetened condensed milk of ten gallons each	693,670
One hundred and thirty-seven thousand three hundred and twenty-two cans cream of ten gallons each	1,373,220
There is also produced within the State of New York and sold during the year to condensers, most of which reaches this market in condensed forms in small cans, a large amount of crude milk estimated to be equal to 1,650,000 cans of crude milk of ten gallons each.....	11,650,000
Total gallons	76,569,830
Valued at	\$12,085,000 00
Total value of butter handled	\$18,109,142 00
Total value of cheese handled	10,233,172 42
Total value of milk, cream and condensed milk handled	12,085,000 00
Total value	\$40,427,314 42

The receipt and value of dairy products handled in New York city during the year ending October 31, 1891, were as follows:

BUTTER.

Eastern, 395,301 packages of seventy pounds average, 27,671,070 pounds, valued at twenty-three cents per pound	\$6,364,346 10
Western, 1,408,324 packages of fifty pounds average, 70,416,200 pounds, valued at twenty-one cents per pound	14,787,402 00
Total pounds, 98,087,270, value	\$21,151,748 10

CHEESE.

Eastern, 86,959,200 pounds, valued at ten cents per pound	\$8,695,920 00
Western, 3,331,960 pounds, valued at nine cents per pound	299,875 50
Total pounds, 90,391,150, value	<u>\$8,995,795 50</u>

MILK.

Six million three hundred and five thousand seven hundred and sixty-six cans of crude milk of ten gallons each	63,057,666
Sixty-nine thousand nine hundred and eighty-nine cans of unsweetened condensed milk of ten gallons each	699,890
One hundred and forty-four thousand cans of cream of ten gallons each	1,441,980
There is also produced within the State of New York and sold during the year to condensers, most of which reaches the New York market in condensed form in small cans, a large amount of crude milk estimated to be not less than	17,500,000
Total gallons	82,699,530
Valued at	<u>\$14,129,677 00</u>
Total value of butter handled	\$21,151,748 10
Total value of cheese handled.....	8,995,795 50
Total value of milk, cream and condensed milk handled	<u>14,129,677 00</u>
Total value of dairy products handled during year	<u>\$45,277,220 60</u>

The preceding statistics show a material decrease in the number of pounds of butter handled in this city, but, as the average price of butter has been three cents per pound higher, the total value of the dairy product handled was \$3,042,606.10 greater than during the previous year.

The following statistics, taken from the records of the New York Mercantile Exchange, show the exports of butter and cheese each year since January 1, 1883:

BUTTER.

From the port of New York, 1883	18,811,400
From the port of New York, 1884	15,865,600
From the port of New York, 1885	14,601,550
From the port of New York, 1886	11,677,750
From the port of New York, 1887	9,933,400
From the port of New York, 1888	7,099,650
From the port of New York, 1889	19,941,176
From the port of New York, 1890	20,623,534
From the port of New York, 1891*	9,973,785
From all ports in the United States, 1883	22,375,708
From all ports in the United States, 1884	21,391,196
From all ports in the United States, 1885	19,593,872
From all ports in the United States, 1886	14,404,727
From all ports in the United States, 1887	12,531,171
From all ports in the United States, 1888	8,749,366
From all ports in the United States, 1889	25,983,054
From all ports in the United States, 1890	23,895,914
From all ports in the United States, 1891*	13,551,525

The above statistics show that the advance in prices during the first ten months of this year has caused a falling off in the export of butter of 7,051,741 pounds, and that the receipts for the year ended October 31, 1891, were only 5,756,160 pounds less than the former year, this shows, that notwithstanding the higher prices that have prevailed, that over 1,000,000 pounds more has been consumed at home than during the previous year.

CHEESE.

From the port of New York, 1883	97,897,850
From the port of New York, 1884	96,634,250
From the port of New York, 1885	82,934,750
From the port of New York, 1886	78,763,400
From the port of New York, 1887	72,529,500

*Ten months.

From the port of New York, 1888	75,830,700
From the port of New York, 1889	75,046,826
From the port of New York, 1890	70,208,270
From the port of New York, 1891*	57,060,950
From all ports in the United States, 1883	111,973,140
From all ports in the United States, 1884	111,950,686
From all ports in the United States, 1885.....	95,047,243
From all ports in the United States, 1886	86,363,685
From all ports in the United States, 1887	87,069,804
From all ports in the United States, 1888.....	81,595,304
From all ports in the United States, 1889	98,140,486
From all parts in the United States, 1890.....	91,014,571
From all ports in the United States, 1891*	71,927,873

The above statistics show that while the advance in the price of cheese has been but slight that the exports during the first ten months of this year have fallen off nearly 20,000,000 pounds, and that the receipts for the year ended October 31, 1891, were only 15,210,055 pounds less than in the former year. This shows that there has been nearly 5,000,000 pounds more consumed at home than in the previous year, which is, without doubt, owing to the improvement in the quality of the cheese manufactured in the State of New York.

The following is a detailed report of the work performed by each employe of the department in this division between September 30, 1890, and September 30, 1891, in prosecuting violators of the laws relating to the sale of oleomargarine:

Edmund S. Wilson, expert, employed in the above service ninety-one days:

Number of days in court.....	24
Number of days obtaining evidence.....	26
Number of days inspecting stores.....	14
Number of days on special duty.....	1
Number of days visiting hotels, restaurants and boarding-houses	26
Total number of days.....	91

*Ten months.

Number of samples purchased and taken.....	81
Number of samples delivered to chemists.....	4
Number of evenings obtaining samples.....	4
Number of appearances in cases.....	27
Number of complaints made.....	4
Number hotels, restaurants and boarding-houses visited....	214
Number of stores inspected.....	1,045
Estimated number of miles traveled.....	3,561

Joseph J. Sorogan, expert, employed in the above service thirty-nine days:

Number of days in court.....	5
Number of days obtaining evidence.....	3
Number of days inspecting stores.....	14
Number of days on special duty.....	4
Number of days visiting hotels, restaurants and boarding-houses	13
Total number of days.....	39

Number of samples purchased and taken.....	42
Number of samples delivered to chemists.....	1
Number of evenings obtaining samples.....	0
Number of appearances in cases.....	5
Number of complaints made.....	0
Number hotels, restaurants and boarding-houses visited....	166
Number of stores inspected.....	443
Estimated number of miles traveled.....	1,640

Thomas R. Gray, expert, employed in the above service ninety-five days:

Number of days in court.....	27
Number of days obtaining evidence.....	22
Number of days inspecting stores.....	16
Number of days visiting hotels, restaurants and boarding-houses	26
Number of days on special duty.....	4
Total number of days.....	95

NEW YORK STATE DAIRY COMMISSIONER.

161

Number of samples purchased and taken.....	84
Number of samples delivered to chemists.....	5
Number of evenings obtaining samples.....	4
Number of appearances in cases.....	39
Number of complaints made.....	3
Number hotels, restaurants and boarding-houses visited....	213
Number stores inspected.....	976
Estimated number miles traveled.....	3,675

Archibald D. Clark, expert, employed in the above service 134 days:

Number of days in court.....	21
Number of days obtaining evidence.....	39
Number of days on special duty.....	23
Number of days inspecting stores.....	29
Number of days visiting hotels, restaurants and boarding-houses	22

Total number days 134

Number of samples purchased and taken.....	95
Number of samples delivered to chemists.....	4
Number of evenings obtaining samples.....	18
Number of appearances in cases.....	40
Number of complaints made.....	4
Number of hotels, restaurants and boarding-houses visited..	222
Number of stores inspected.....	839
Estimated number of miles traveled.....	4,310

William W. Meeteer, expert, employed in the above service 100 days:

Number of days in court.....	29
Number of days obtaining evidence.....	19
Number of days inspecting stores.....	41
Number of days on special duty.....	1
Number of days visiting hotels, restaurants and boarding-houses	10

Total number of days..... 100

Number of samples purchased and taken.....	61
Number of samples delivered to chemists.....	6
Number of evenings obtaining samples.....	14
Number of appearances in cases.....	31
Number of complaints made.....	6
Number of hotels, restaurants and boarding-houses visited,	232
Number of stores inspected.....	1,809
Estimated number of miles traveled.....	4,025

Joseph F. Geisler, Ph. C., F. C. S.:

Number of analyses of oleomargarine and butter samples..	9
Number of appearances in cases.....	18
Number of days in court.....	12

Edward G. Love, Ph. D.:

Number of analyses of oleomargarine and butter samples..	3
Number of appearances in cases.....	8
Number of days in court.....	5

Charles M. Stillwell, A. M., and Thomas S. Gladding, A. M.:

Number of analyses of oleomargarine and butter samples..	3
Number of appearances in cases.....	28
Number of days in court.....	17

LaRoy S. Gove, counsel:

Number of cases prosecuted.....	3
Number of cases disposed of.....	3
Number of convictions.....	3
Number of appearances in cases.....	8
Number of days in court.....	7

Francis V. S. Oliver, counsel:

Number of cases prosecuted.....	2
Number of cases disposed of.....	2
Number of convictions.....	2
Number of appearances in cases.....	5
Number of days in court.....	5

Cook & Salmon, counsel:

Number of cases prosecuted.....	5
Number of cases disposed of.....	5
Number of convictions.....	4
Number of acquittals.....	1
Number of appearances in cases.....	14
Number of days in court.....	13

Barnard & Olendorf, counsel:

Number of cases prosecuted.....	6
Number of cases disposed of.....	6
Number of convictions.....	5
Number of acquittals.....	1
Number of appearances in cases.....	20
Number of days in court.....	19

TOTAL (*Oleomargarine*).

Number of days (experts).....	459
Number of days in court, experts, counsel and chemists....	184
Number of days obtaining evidence.....	109
Number of days on special duty.....	33
Number of days inspecting stores.....	114
Number of days visiting hotels, restaurants and boarding-houses	97
Number of samples purchased and taken.....	363
Number of samples delivered to chemists.....	21
Number of evenings obtaining samples.....	40
Number of appearances in cases.....	243
Number of complaints made.....	17
Number of stores inspected.....	5,112
Number of hotels, restaurants and boarding-houses visited,	1,047
Estimated number of miles traveled.....	17,211
Number of analyses of oleomargarine and butter samples..	21
Number of cases prosecuted.....	17

Number of cases disposed of.....	16
Number of convictions	13
Number of cases dismissed from calendar.....	1
Number of cases acquitted on trial.....	2
Number of cases awaiting trial.....	1

The following statement represents prosecutions commenced during the year ending September 30, 1891, under chapter 183, Laws of 1885, as amended by chapter 577, Laws of 1886, and by chapter 583, Laws of 1887, relating to the sale of oleomargarine, and the present status of the cases:

CASE No. 1265 H.

THE PEOPLE *v.* WALSH.

General Sessions Court, Westchester County, N. Y.

Before grand jury March 10, 1891; indicted. Case called for trial May tenth. Adjourned to June fourth; adjourned to September seventeenth, and transferred to Court of Oyer and Terminer.

Witnesses: W. W. Meeteer, Arch. D. Clark and C. M. Stillwell, chemist.

CASE No. 590 G.

THE PEOPLE *v.* SEEBECK.

Tombs Police Court, New York City.

Warrant issued March 13, 1891; answered to March fourteenth; adjourned to sixteenth, to April first, to eighth, to fifteenth, to twenty-second, to May sixth, and tried and acquitted.

Counsel, Barnard and Olendorf.

Witnesses: T. R. Gray, E. S. Wilson and C. M. Stillwell, chemist.

CASE No. 490 F.

THE PEOPLE v. MAXWELL.

Justice Goetting's Police Court, Brooklyn, N. Y.

Warrant issued February 27, 1891; answered to February twenty-eighth; adjourned to March twenty-sixth, and held to bail for trial. Called for trial March 31, 1891. Pleaded guilty. Fined \$100.

Counsel, Cook and Salmon.

Witnesses: E. S. Wilson, T. R. Gray, and chemist, E. G. Love.

CASE No. 491 F.

THE PEOPLE v. HALL.

Essex Market Police Court, New York City.

Warrant issued March 31, 1891; answered to April second; adjourned to April seventh, to fourteenth, and held to bail for trial at Special Sessions. Called for trial May fifth. Tried, convicted and fined fifty dollars.

Counsel, Barnard and Olendorf.

Witnesses: E. S. Wilson, T. R. Gray, and chemist, J. F. Geisler.

CASE No. 1090 K.

THE PEOPLE v. POUND.

Jefferson Market Police Court, New York City.

Warrant issued April 7, 1891; answered to April eighth, held to bail for trial at Special Sessions. Called for trial April fifteenth. Adjourned to twenty-second, and pleaded guilty. Fined fifty dollars.

Counsel, L. S. Gove.

Witnesses: Arch. D. Clark, W. W. Meeteer, and chemist, J. F. Geisler.

CASE No. 492 G.

THE PEOPLE v. HARRISON.

Justice Goetting's Police Court, Brooklyn, N. Y.

Warrant issued April 17, 1891; answered to April eighteenth; adjourned to thirtieth, to May fourteenth, to twenty-first, and tried by jury. Acquitted.

Counsel, Cook and Salmon.

Witnesses: E. S. Wilson, T. R. Gray, and chemist, C. M. Stillwell.

CASE No. 489.

PEOPLE v. PALOS.

Essex Market Police Court, New York City.

Warrant issued March 31, 1891; answered to April second; adjourned to seventh, to fourteenth, to May sixth, tried. Convicted. Fined fifty dollars.

Counsel, Barnard and Olendorf.

Witnesses: E. S. Wilson, T. R. Gray, and chemist, J. F. Geisler.

CASE No. 1264 H.

THE PEOPLE v. POUND.

Jefferson Market Police Court, New York City.

Warrant issued April 7, 1891; answered to April eighth; held to bail for trial at Special Sessions. Called for trial April twenty-second. Pleaded guilty. Fined fifty dollars.

Counsel, Barnard and Olendorf.

Witnesses: W. W. Meeteer, Arch D. Clark, and chemist, C. M. Stillwell.

CASE No. 1266 H.

THE PEOPLE v. ROWN.

Justice Tighe's Police Court, Brooklyn, N. Y.

Warrant issued April 15, 1891; answered to April seventeenth; adjourned to twenty-eighth, to May thirteenth, to May twenty-sixth, to June second, and tried. Convicted. Fined \$100.

Counsel, A. C. Salmon.

Witnesses: W. W. Meeteer, Arch D. Clark, and chemist, C. M. Stillwell.

CASE No. 1267 H.

THE PEOPLE v. FOLEY.

Jefferson Market Police Court, New York City.

Warrant issued April 22, 1891; answered to April twenty-third; held to bail for trial at Special Sessions. Called for trial May fourth. Adjourned to sixth, to twelfth, to June third, and pleaded guilty, and case dismissed.

Counsel, C. D. Olendorf.

Witnesses: W. W. Meeteer, J. J. Sorogan, and chemist, J. F. Geisler.

CASE No. 1268 H.

THE PEOPLE v. THORP.

Jefferson Market Police Court, New York City.

Warrant issued April 17, 1891; answered to April twenty-first; held to bail for trial at Special Sessions. Called for trial April twenty-ninth. Adjourned to May sixth, and pleaded guilty. Fined fifty dollars.

Counsel, F. V. S. Oliver.

Witnesses: W. W. Meeteer, Arch D. Clark, and chemist, C. M. Stillwell.

CASE No. 1091 K.

THE PEOPLE v. FOLEY.

Essex Market Police Court, New York City.

Warrant issued April 23, 1891; answered to April twenty-fourth; adjourned to May seventh for examination, and held to bail for trial at Special Sessions. Called for trial June third. Pleaded guilty. Fined \$100.

Counsel, L. S. Gove.

Witnesses: Arch D. Clark, W. W. Meeteer, and chemist, C. M. Stillwell.

CASE No. 1092 K.

THE PEOPLE v. BOWERS.

Justice Walsh's, Police Court, Brooklyn, N. Y.

Warrant issued, April 28, 1891; answered to April thirtieth; held to bail for trial at Special Sessions. Called for trial May sixth. Pleaded guilty. Fined fifty dollars.

Counsel, A. C. Salmon.

Witnesses: Arch D. Clark, W. W. Meeteer, and chemist, E. C. Love.

CASE No. 1269 H.

PEOPLE v. SLATTERY.

Jefferson Market Police Court, New York City.

Warrant issued April 27, 1891; answered to May seventh; held to bail for trial at Special Sessions. Called for trial May fourteenth. Pleaded guilty. Fined fifty dollars.

Counsel, F. V. S. Oliver.

Witnesses: W. W. Meeteer, Arch. D. Clark, and chemist, E. G. Love.

CASE No. 1093 K.

PEOPLE v. LONG.

Jefferson Market Police Court, New York City.

Warrant issued May 12, 1891; answered to May thirteenth; held to bail for trial at Special Sessions. Called for trial May twentieth. Pleaded guilty. Fined fifty dollars.

Counsel, L. S. Gove.

Witnesses: Arch. D. Clark, W. W. Meeteer, and chemist, J. F. Geisler.

CASE No. 593 G.

THE PEOPLE v. BERGIN.

Essex Market Police Court, New York City.

Warrant issued May 26, 1891; answered to May twenty-eighth; held to bail for trial at Special Sessions. Called for trial June eleventh. Pleaded guilty. Fined fifty dollars.

Counsel, Barnard and Olendorf.

Witnesses: T. R. Gray, E. S. Wilson, and chemist, E. G. Love.

CASE No. 592 G.

THE PEOPLE v. LINDSAY.

Justice Goetting's Police Court, Brooklyn, N. Y.

Warrant issued March 13, 1891; answered to April 6, 1891; held to bail for trial at Special Sessions. Called for trial April seventh. Pleaded guilty. Fined \$100.

Counsel, Cook and Salmon.

Witnesses: Patrick Harrington, E. S. Wilson, T. R. Gray, and chemist, J. F. Geisler.

The result of the seventeen preceding prosecutions for violations of the oleomargarine law commenced between September 30, 1890, and September 30, 1891, were as follows:

Convicted on trial, or pleading guilty	13
Acquitted	2
Dismissed from calendar	1
Awaiting trial	1
Total	17
Total fines imposed	\$950 00

I am pleased to be able to report that the quality of the cheese received in this city has improved from year to year, ever since the system adopted by the Dairy Commission of instructing cheese-makers that were not already experts in the business how to make the best cheese possible.

Nearly every wholesale dealer in cheese in this city has remarked on the improvement in the quality of cheese as a whole and stated that in their opinion, it was a step in the right direction and that they hoped that the Legislature would properly recognize the benefit already derived by what has been done and increase the appropriation for the dairy department to such an extent that every cheese factory in the State can be frequently visited by the instructors, and such cheese-makers as were not manufacturing cheese of full standard quality can have the benefit of such instructions as may be found necessary to correct faults in the manufacture and handling of this important dairy product. It is also suggested, by those in a position to have the full knowledge of the matter, that the system of instruction can be profitably extended to the producers of milk by instructing them as to the proper manner of caring for their milk in order that the best possible butter and cheese can be made from their product. Many dairy-men do handle their product in a proper manner, but as the process of manufacturing butter and cheese requires that the milk from a large number of dairies must be mixed, the highest grade of goods can not be made until all parties shall deliver their milk in the best possible condition.

The cheese brand law continues to grow in favor with all classes of dealers in cheese; in fact, the State brand is recognized by the wholesale dealer, the retail dealer and by the exporters as a guarantee that the cheese is full-cream whenever the brand is found upon it. For this reason, it is very hard to sell any cheese as full-cream cheese without it is branded, as the buyer in nearly every case is suspicious of any cheese that is not stamped with the State brand.

The demand for State brand cheese has increased yearly and, in my opinion, will in a few years cause every manufacturer to brand his cheese, if full-cream, and then the problem of brand-

ing skim-cheese will be solved, as a cheese with no brand on it will be classed as skimmed cheese.

A close watch has been kept on the receipts of western cheese to see whether lard, or what is commonly called "Filled Cheese" was or was not being shipped into the State by the manufacturers and dealers in that class of goods in the State of Illinois. None have been discovered during the year, and as the dealers in pure cheese are very jealous of the record that New York city has for handling only straight goods, I think it next to impossible for any one to handle the spurious article without being detected, as any one of the dealers in pure cheese would not hesitate to call my attention to goods that were of a suspicious character.

REPORT ON MILK.

The same conditions have existed during the past as in the preceding year, therefore I have divided my attention between looking after violations of the oleomargarine, milk and vinegar laws, giving the greatest share of attention to looking after violations of the milk law.

During the fall and winter months of the year reported, the State experts employed in this division of the dairy department were directed to give their attention mainly to the milk sold in the cities of New York and Brooklyn, as well as in the smaller cities in this division of the dairy department, which resulted in keeping the adulteration down to a minimum during the period named. The experts were also instructed to look after oleomargarine and adulterated vinegar, as the same parties that were liable to sell adulterated milk were equally liable to sell oleomargarine or adulterated vinegar.

The experts were kept on this duty in the cities until about May first, when I thought it advisable to withdraw them from the duty of inspecting milk in the hands of wholesale dealers, peddlers and retail dealers, and detailed them to the duty of inspecting the milk shipped to market from New York, Kings, Queens, Suffolk and Richmond counties, and that part of Westchester county south of and including White Plains, which is within this division.

On or about July first the State experts were withdrawn from the rural districts and detailed to the duty of looking after adulterated milk sold at the watering places, which resulted in discovering several parties serving adulterated milk to the hotels and boarding-houses at the summer resorts. After giving the milk served at these resorts a thorough inspection, the State experts were returned to the cities, when it was found that, as usual, the absence of the experts from the cities had been discovered by the wholesale and retail dealers and they had, to a grater extent than usual, again commenced adulterating the milk they were serving to their patrons. Several prosecutions were promptly made, which very soon greatly reduced the percentage of adulteration, and by the close of the year reported, the percentage was reduced to a minimum.

This proves that the dairy experts cannot be withdrawn from any one point in this division without great detriment to the service; at the same time, I have not sufficient force to cover the whole district at any one time. For this reason, some portion of the district has had to be left without attention during some part of the year.

Very few persons in this State recognize the magnitude of the work required to supervise the dairy products consumed by three million people and to protect the consumers against the adulteration of this necessary article of food. This division of the dairy department represents fully three-sevenths of the population of the State and over one-half of those outside of the producers that consume dairy products.

I will further state that those in a position to judge, concede that the milk consumed in this division of the dairy department during the past year has been of a standard nearly equal to last year and not excelled in purity by milk sold in any other city in the United States.

During the month of August an inspection of milk arriving over the different railroads and steamboats for consumption in New York and Brooklyn was made after the milk had been delivered by the common carriers to the grocers and peddlers. The plan adopted was, as usual, to obtain from the police depart-

ment a detail of two or more officers for duty at each depot when inspected. With their assistance, the wagons were formed in line as they came off the ferries or from the railroad depots into the streets. We then inspected the milk found on each wagon before allowing it to leave the line. With the assistance of a detail of two experts from the third division of the dairy department, and the entire force in this division, we were enabled, with the assistance of from four to six police officers kindly detailed for this duty by acting superintendent of police, Thomas Byrnes, to cover all the points at which any one railroad delivered milk in one night, while on other nights we were able to inspect all milk delivered by two or more of the roads delivering only small quantities, thereby giving the milk arriving in the city a thorough inspection. The milk arriving over the New York and Northern road delivered at High Bridge station, comprising 935 cans, was inspected on the night of August twentieth. The milk arriving over the New York and Harlem railroad, delivered at East Forty-eighth street and Lexington avenue, comprising 1,832 cans, was inspected on the night of August nineteenth. The milk arriving over the New York, Ontario and Western railroad, delivered at Jay and West Forty-second street ferries, comprising 2,414 cans, was inspected on the night of August twenty-second. The milk arriving over the New York, Susquehanna and Western railroad, delivered at Cortlandt and Desbrosses street ferries, comprising 1,452 cans, was inspected on the night of August twenty-first. The milk arriving over the West Shore railroad, delivered at Jay and West Forty-second street ferries, comprising 985 cans, was inspected on the night of August twenty-second. The milk arriving over the Delaware, Lackawanna and Western railroad, delivered at Barclay and Christopher street ferries, comprising 3,500 cans, was inspected on the night of August twenty-first. The milk arriving over the Homer Ramsdell Transportation Company's boats, delivered at Franklin street and West One Hundred and Twenty-ninth street docks, comprising 902 cans, was inspected on the night of August twenty-second. The milk arriving over the New York, Lake Erie and Western railroad, delivered at Chambers and Twenty-third street ferries, comprising 4,224 cans, was

inspected on the night of August eighteenth. The milk arriving over the New Jersey Central railroad, delivered at Liberty street ferry, comprising 387 cans, was inspected on the night of August nineteenth. The milk arriving over the New York, New Haven and Hartford railroad, delivered at Montgomery street and One Hundred and Twenty-ninth street docks, comprising 909 cans, was inspected on the night of August twentieth. The milk arriving over the Long Island railroad, delivered at Flatbush and Bushwick avenue stations, comprising 198 cans, was inspected on the night of August twenty-fifth.

The milk inspected when delivered by each railroad and steamboat line represents one day's shipment over each line for consumption in New York and Brooklyn, to which must be added 1,000 cans average per day, estimated to arrive by miscellaneous conveyances. The result of these inspections showed by the test applied that only a small percentage had been adulterated.

The following table will show, in a condensed form, the daily average amount of milk and cream received in New York and Brooklyn over each railroad and steamboat during August 1891, to wit:

	Cans milk	Cans cream
New York, Lake Erie and Western railroad.....	4,224	225
New York and Harlem railroad.....	1,832	3
New York, Ontario and Western railroad.....	2,414	253
New York, Susquehanna and Western railroad...	1,452	35
New York and Northern railroad.....	935	0
West Shore railroad.....	935	35
New York, New Haven and Hartford railroad....	909	0
Delaware, Lackawanna and Western railroad....	3,500	0
Homer Ramsdell Transportation Company.....	902	32
New Jersey Central railroad.....	387	9
Long Island railroad.....	198	4
Miscellaneous receipts by wagons (estimated)....	1,000	2
Daily average during August.....	18,738	698

The total number of dairies and creameries of milk
represented by the above statement..... 2,973

The foregoing statement of inspections of milk on arrival in New York city showed, by the test applied, as compared with the two preceding years, a slight increase in the number of cans of milk that were of a doubtful standard. Also the milk inspected during the year, after it had reached the hands of the wholesale and retail dealers, has also shown an increased percentage of adulteration compared to the two preceding years. The increased percentage of adulteration shown has been of but small amount, but enough to fully demonstrate that the reduction in the number of State experts formerly employed in this division of the department and in the districts where the milk for consumption in the cities is produced, has been observed by some of the producers and dealers in milk, who have taken advantage of the fact and commenced to adulterate their goods to a greater extent than usual.

It is also a fact that a very large majority of producers of, and also of the dealers in, milk do not adulterate their goods and would not do so under any circumstances, yet there are a few of both producers and dealers that will adulterate milk whenever they think they can do so without being detected; consequently it is necessary that the State experts should make more frequent inspections than can be done with the limited force employed in this division of the department. There are over 5,000 different parties in the cities of New York and Brooklyn that handle the milk that is consumed in the two cities, some handling large quantities and others lesser amounts; in fact, some parties retailing less than one can per day.

While I am fully aware that the dairy department has to recognize demands upon the service from all parts of the State, and that the demands are much greater than can be supplied with the number of employes possible to be compensated from the present appropriation, I consider it my duty to call attention to the fact that it is impossible, with the limited number of employes allotted to this division of the department, to keep the adulteration of milk as fully under control as the interests of the consumers demand that it should be. I am also aware that the same condi-

tions that apply to the second division, where the milk is consumed, will apply to the third and fourth divisions, where a large share of the milk shipped to the cities is produced.

The status of the following thirteen prosecutions for violation of the law relating to adulterated milk was fully stated to you in my seventh annual report; the final disposition of twelve of them and present status of one remaining untried is given in the annexed table:

DISPOSITION OF CASES REMAINING UNTRIED SEPTEMBER 30, 1891.

Bottle number.	NAMES.	Called for trial.	Court.	City.	Result.	Fined.
1884.....	The People v. Memmeyer.....	.....	General Sessions.....	New York.....	Indicted.....	*
1900.....	The People v. Viebrook.....	October 8, 1890.....	Special Sessions.....	New York.....	Pleaded guilty.....	\$35 00
1876.....	The People v. Loitz.....	October 8, 1890.....	Special Sessions.....	New York.....	Pleaded guilty.....	25 00
2762.....	The People v. Foley.....	December 8, 1890.....	Special Sessions.....	New York.....	Pleaded guilty.....	25 00
1926.....	The People v. Caslandieck.....	November 7, 1890.....	Special Sessions.....	Brooklyn.....	Dismissed.....	.....
2762.....	The People v. Goodman.....	October 8, 1890.....	Special Sessions.....	New York.....	Pleaded guilty.....	25 00
2765.....	The People v. Clancy.....	December 18, 1890.....	Special Sessions.....	Long Island City.....	Acquitted.....	.....
2789.....	The People v. Johnson.....	October 8, 1890.....	Special Sessions.....	Long Island City.....	Dismissed.....	.....
2761.....	The People v. Brunning.....	October 8, 1890.....	Special Sessions.....	New York.....	Pleaded guilty.....	25 00
2802.....	The People v. Cole.....	December 8, 1890.....	Special Sessions.....	New York.....	Acquitted.....	.....
2880.....	The People v. Haverker.....	October 6, 1890.....	Special Sessions.....	Brooklyn.....	Pleaded guilty.....	25 00
2765.....	The People v. Robinson.....	October 21, 1890.....	Special Sessions.....	Yonkers.....	Pleaded guilty.....	25 00
2761.....	The People v. Delehanaty.....	October 16, 1890.....	Special Sessions.....	Yonkers.....	Pleaded guilty.....	†

* Awaiting trial.

† Sentence suspended.

The following statement represents prosecutions during the year ending September 30, 1891, for violations of chapter 183, Laws of 1885, as amended by chapter 223, Laws of 1887, relating to adulterated milk and the present status of the cases:

BOTTLE No. 2797.

THE PEOPLE v. NIEBUHR.

Justice Walsh's Police Court, Brooklyn, N. Y.

Warrant issued October 11, 1890; answered to October thirteenth. Pled guilty. Fined twenty-five dollars.

Witnesses: W. W. Meeteer, T. R. Gray, and chemist, Thos. S. Gladding.

BOTTLE No. 2796.

THE PEOPLE v. GARDNER.

Jefferson Market Police Court, New York.

Warrant issued October 10, 1890; answered to October thirteenth; held to bail for trial at Special Sessions. Called for trial October twenty-third; adjourned to November third, and pleaded guilty. Fined twenty-five dollars.

Counsel, Chas. D. Olendorf.

Witnesses: W. W. Meeteer, T. R. Gray, and chemist, T. S. Gladding.

BOTTLE No. 2777.

THE PEOPLE v. CLANCY.

General Sessions Court, Long Island City, N. Y.

Before Grand Jury October 6, 1890. Indicted.

Witnesses: W. W. Meeteer, T. R. Gray, and chemist, E. G. Love.

BOTTLE No. 2765.

THE PEOPLE v. CLANCY.

Civil Penalty Action, Supreme Court, Queens County, N. Y.

Summons issued September 13, 1890; returnable October —.

Tried by jury October sixth. Convicted and fined \$100.

Counsel, Cook and Salmon.

Witnesses: T. R. Gray, W. W. Meeteer, and chemist, E. G. Love.

BOTTLE No. 2741.

THE PEOPLE v. HAVILAND.

Justice Walsh's Police Court, Brooklyn, N. Y.

Warrant issued October 11, 1890; answered to October thirteenth, and pleaded guilty. Fined fifty dollars.

Witnesses: W. W. Meeteer, T. R. Gray, and chemist, Thos. S. Gladding.

BOTTLE No. 2772.

THE PEOPLE v. SMITH.

Tombs Police Court, New York City.

Warrant issued October 8, 1890; answered to October ninth; held to bail for trial at Special Sessions. Called for trial October 23, 1890. Plead guilty. Fined twenty-five dollars.

Counsel, A. C. Salmon.

Witnesses: T. R. Gray, H. Schloss, and chemist, C. M. Stillwell.

BOTTLE No. 2799.

THE PEOPLE v. SCHUMAN.

Justice Kenna's Court, Brooklyn, N. Y.

Warrant issued November 11, 1890; answered to November twelfth; adjourned to November twentieth. Plead guilty. Fined twenty five dollars.

Counsel, A. C. Salmon.

Witnesses: W. W. Meeteer, T. R. Gray, and chemist, T. S. Gladding.

BOTTLE No. 2800.

THE PEOPLE v. MURPHY.

Justice Higbie's Police Court, Woodhaven, N. Y.

Warrant issued November 29, 1890; answered February 19, 1891; adjourned to February twenty-fifth, and tried by jury. Acquitted.

Counsel, Benj. W. Downing.

Witnesses: W. W. Meeteer, T. R. Gray, and chemist, T. R. Gladding.

BOTTLE No. 2831.

THE PEOPLE v. SAVARESE.

Justice Tighe's Police Court, Brooklyn, N. Y.

Warrant issued November 24, 1890; answered to November twenty-sixth. Pleaded guilty. Fined twenty-five dollars.

Witnesses: T. R. Gray, W. W. Meeteer, and chemist, C. M. Stillwell.

BOTTLE No. 2828.

THE PEOPLE v. DARRAGH.

Justice Higbie's Court, Woodhaven, N. Y.

Warrant issued November 29, 1890; answered to February 19, 1891; adjourned to February 24, 1891. Tried by jury. Acquitted.

Counsel, B. W. Downing.

Witnesses: T. R. Gray, W. W. Meeteer, and chemist, T. S. Gladding.

BOTTLE No. 2837.

THE PEOPLE v. MOHLAN.

Justice Kenna's Police Court, Brooklyn, N. Y.

Warrant issued November 10, 1890; answered to November twelfth; adjourned to November twentieth, and pleaded guilty. Fined twenty-five dollars.

Counsel, A. C. Salmon.

Witnesses: T. R. Gray, W. W. Meeteer, and Thomas S. Gladding, chemist.

BOTTLE No. 2801.

THE PEOPLE v. GSAUGER.

Justice Tighe's Police Court, Brooklyn, N. Y.

Warrant issued November 24, 1890; answered to November twenty-sixth. Pledaded guilty. Fined twenty-five dollars.

Witnesses: W. W. Meeteer, T. R. Gray, and chemist, T. S. Gladding.

BOTTLE No. 2802.

THE PEOPLE v. SCHARFF.

Justice Tighe's Police Court, Brooklyn, N. Y.

Warrant issued November 24, 1890; answered to November twenty-sixth; adjourned to December first. Pledaded guilty. Fined twenty-five dollars.

Witnesses: W. W. Meeteer, T. R. Gray, and chemist, T. S. Gladding.

BOTTLE No. 2521.

THE PEOPLE v. DUCHARDT, JR.

Harlem Police Court, New York City.

Warrant issued November 21, 1890; answered to November twenty-first; adjourned to November twenty-fifth, for examination, and held to bail for trial at Special Sessions. Called for trial December 4, 1890. Pledaded guilty. Fined twenty-five dollars.

Counsel, La Roy S. Gove.

Witnesses: Arch. D. Clark, W. W. Meeteer, and chemist, F. G. Love.

BOTTLE No. 2805.**THE PEOPLE v. LARSON.***Justice Walsh's Police Court, Brooklyn, N. Y.*

Warrant issued November 19, 1890; answered to November twentieth; adjourned to November twenty-sixth, to December third, to December eleventh, and tried. Convicted. Fined twenty-five dollars.

Counsel, Cook and Salmon.

Witnesses: Arch. D. Clark, George W. Price, and chemist, J. F. Geisler.

BOTTLE No. 2192.**THE PEOPLE v. BLANK.***Tombs Police Court, New York City.*

Warrant issued November 19, 1890; answered to November twentieth; adjourned to November twenty-sixth, to December fourth, to December tenth, for examination, and case dismissed.

Counsel, LaRoy S. Gove.

Witnesses: Arch. D. Clark, George W. Price, and chemist, T. S. Gladding.

BOTTLE No. 2450.**THE PEOPLE v. TREDWELL.***Justice Hewlett's Court, Hempstead, N. Y.*

Warrant issued December 5, 1890; answered to January 14, 1891. Tried by jury. Acquitted.

Counsel, B. W. Downing.

Witnesses: W. W. Meeteer, T. R. Gray, and chemist, T. S. Gladding.

BOTTLE No. 2785.

THE PEOPLE v. BERMISTER.

Justice Goetting's Police Court, Brooklyn, N. Y.

Warrants issued December 6, 1890; answered to December tenth; adjourned to December eleventh. Pleaded guilty. Fined twenty-five dollars.

Witnesses: E. S. Wilson, T. R. Gray, and chemist, T. S. Gladding.

BOTTLE No. 2551.

THE PEOPLE v. WEGMAN.

Justice Goetting's Police Court, Brooklyn, N. Y.

Warrant issued December 13, 1890; answered to December fifteenth; adjourned to January 15, 1891, to February seventeenth, to February twenty-fourth, and dismissed. Warrant reissued by Justice Goetting on March 20, 1891; adjourned to March twenty-fourth. Tried. Convicted and fined twenty-five dollars.

Counsel, Cook and Salmon.

Witnesses: T. R. Gray, E. S. Wilson, and chemist, T. S. Gladding.

BOTTLE No. 2832.

THE PEOPLE v. SMITH.

Jefferson Market Police Court, New York City.

Warrant issued December 27, 1890; answered to December twenty-ninth; held to bail for trial at Special Sessions. Called for trial January 7, 1891. Pleaded guilty. Fined twenty-five dollars.

Witnesses: T. R. Gray, J. J. Sorogan, and chemist, T. S. Gladding.

BOTTLE No. 2557.**THE PEOPLE v. KOHLMAN.***Justice Goetting's Police Court, Brooklyn, N. Y.*

Warrant issued February 14, 1891; answered to February seventeenth. Pleaded guilty. Fined twenty-five dollars.

Witnesses: T. R. Gray, E. S. Wilson, and chemist, T. S. Gladding.

BOTTLE No. 2558.**THE PEOPLE v. WINES.***Justice Goetting's Police Court, Brooklyn, N. Y.*

Warrant issued February 14, 1891; answered to February seventeenth. Pleaded guilty. Fined twenty-five dollars.

Witnesses: T. R. Gray, E. S. Wilson, and chemist, T. S. Gladding.

BOTTLE No. 2553.**THE PEOPLE v. PETERS.***Justice Goetting's Police Court, Brooklyn, N. Y.*

Warrant issued February 14, 1891; answered to February seventeenth and pleaded guilty. Fined twenty-five dollars.

Witnesses: T. R. Gray, E. S. Wilson, and chemist, T. S. Gladding.

BOTTLE No. 2581.**THE PEOPLE v. SULLIVAN.***Justice Goetting's Police Court, Brooklyn, N. Y.*

Warrant issued, August 1, 1891; answered to August 6, 1891. Pleaded guilty. Fined twenty-five dollars.

Witnesses: T. R. Gray, E. S. Wilson, and chemist, J. F. Geisler.

BOTTLE No. 2560.

THE PEOPLE *v.* KASCHTUNSKY.

Essex Market Police Court, New York City.

Warrant issued March 18, 1891; answered to March nineteenth; held to bail for trial at Special Sessions. Called for trial March twenty-sixth. Pleaded guilty. Fined twenty-five dollars.

Witnesses: T. R. Gray, E. S. Wilson, and chemist, T. S. Gladding.

BOTTLE No. 2545.

THE PEOPLE *v.* FEDRO.

Jefferson Market Police Court, New York City.

Warrant issued April 22, 1891; answered to April twenty-third; held to bail for trial at General Sessions; before grand jury April 30, 1891. Indicted.

Counsel, Barnard and Olendorf.

Witnesses: W. W. Meeteer, Arch. D. Clark, and chemist, J. F. Geisler.

BOTTLE No. 2579.

THE PEOPLE *v.* VALENTINE.

Justice Connorton's Court, Flushing, N. Y.

Warrant issued August 8, 1891; answered to August tenth. Pleaded guilty. Fined twenty-five dollars.

Witnesses: W. W. Meeteer, T. C. Du Bois, and chemist, J. F. Geisler.

BOTTLE No. 2550.

THE PEOPLE *v.* SIMONSON.

Justice Steinert's Court, Hicksville, N. Y.

Warrant issued August 13, 1891; answered to August seventeenth. Pleaded guilty. Fined twenty-five dollars.

Witnesses: W. W. Meeteer, T. C. Du Bois, and chemist, T. S. Gladding.

BOTTLE No. 2574.

THE PEOPLE v. TOWNSEND.

Justice Steinert's Court, Hicksville, N. Y.

Warrant issued August 13, 1891; answered to September first; adjourned to September tenth, to twenty-ninth, and pleaded guilty. Fined twenty-five dollars.

Witnesses: W. W. Meeteer, T. C. Du Bois, and chemist, T. S. Gladding.

BOTTLE No. 2578.

THE PEOPLE v. SEIBERT.

Justice Vacheron's Court, Woodhaven, N. Y.

Warrant issued August 14, 1891; answered to August twentieth; adjourned to twenty-seventh, to September seventeenth. Tried by jury. Convicted. Fined twenty-five dollars.

Counsel, W. F. Wyckoff.

Witnesses: W. W. Meeteer, T. C. Du Bois, and chemist, T. S. Gladding.

BOTTLE No. 2573.

THE PEOPLE v. LETTING.

Justice Steinert's Court, Hicksville, N. Y.

Warrant issued August 13, 1891; answered to August twenty-fifth. Pledaded guilty. Fined twenty-five dollars.

Witnesses: W. W. Meeteer, Arch. D. Clerk, and chemist, E. G. Love.

BOTTLE No. 2607.

THE PEOPLE v. BACKER.

Justice Tice's Court, Mt. Vernon, N. Y.

Warrant issued August 13, 1891; answered to August seventeenth; held to bail for trial August twenty-fifth. Pledaded guilty. Fined twenty-five dollars.

Counsel, David Swits.

Witnesses: W. W. Meeteer, Arch D. Clark, and chemist, J. F. Geisler.

BOTTLE No. 2827.

THE PEOPLE v. WALSH.

Justice Tice's Court, Mt. Vernon, N. Y.

Warrant issued September 8, 1891; answered to September sixteenth. Pled guilty. Fined twenty-five dollars.

Counsel, David Swits.

Witnesses: E. S. Wilson, T. C. Du Bois, and chemist, J. F. Geisler.

BOTTLE No. 2833.

THE PEOPLE v. PRUNCHNOW.

Justice Tighe's Police Court, Brooklyn, N. Y.

Warrant issued August 5, 1891; answered to August seventh. Pled guilty. Fined twenty-five dollars.

Witnesses: Gray, Wilson, and chemist, Gladding.

BOTTLE No. 2566.

THE PEOPLE v. VALE.

Justice Tighe's Police Court, Brooklyn, N. Y.

Warrant issued August 5, 1891; answered to August sixth. Pled guilty. Fined twenty-five dollars.

Witnesses: E. S. Wilson, T. R. Gray, and chemist, J. F. Geisler.

BOTTLE No. 2562.

THE PEOPLE v. CAMBELL.

Justice Kenna's Police Court, Brooklyn, N. Y.

Warrant issued August 13, 1891; answered to August seventeenth. Pled guilty. Fined twenty-five dollars.

Witnesses: E. S. Wilson, T. R. Gray, and chemist, J. F. Geisler.

BOTTLE No. 2568.**THE PEOPLE v. FRAZER.***Justice Goetting's Police Court, Brooklyn, N. Y.*

Warrant issued August 4, 1891; answered to August sixth; adjourned to seventh, to fourteenth, to September fourth, to eleventh, to twenty-fifth, and tried by jury. Acquitted.

Witnesses: E. S. Wilson, T. R. Gray, and chemist, J. F. Geisler.

BOTTLE No. 2582.**THE PEOPLE v. BODE.***Justice Goetting's Police Court, Brooklyn, N. Y.*

Warrant issued August 4, 1891; answered to August sixth. Plead guilty. Fined twenty-five dollars.

Witnesses: T. R. Gray, E. S. Wilson, and chemist, J. F. Geisler.

BOTTLE No. 2584.**THE PEOPLE v. BETZ.***Justice Goetting's Police Court, Brooklyn, N. Y.*

Warrant issued August 4, 1891; answered to August sixth. Plead guilty. Fined twenty-five dollars.

Witnesses: T. R. Gray, E. S. Wilson, and chemist, J. F. Geisler.

BOTTLE No. 2587.**THE PEOPLE v. PERGGE.***Justice Goetting's Police Court, Brooklyn, N. Y.*

Warrant issued August 4, 1891; answered to August sixth. Plead guilty. Fined fifty dollars.

Witnesses: T. R. Gray, E. S. Wilson, and chemist, J. F. Geisler.

BOTTLE No. 2589.

THE PEOPLE v. BOEHLE.

Justice Hunold's Court, College Point, N. Y.

Warrant issued August 11, 1891; answered to August twelfth. Pleaded guilty. Fined twenty-five dollars.

Witnesses: T. R. Gray, J. J. Sorogan, and chemist, T. S. Gladding.

BOTTLE No. 2597.

THE PEOPLE v. DWYER.

Justice Tice's Court, Mt. Vernon, N. Y.

Warrant issued August 12, 1891; answered to August twentieth; held to bail for trial at Special Sessions. Called for trial August twenty-seventh. Tried, convicted. Fined twenty-five dollars.

Counsel, David Swits.

Witnesses: T. R. Gray, J. J. Sorogan, and chemist, C. M. Stillwell.

BOTTLE No. 2588.

THE PEOPLE v. GRANDISON.

Justice Marshall's Court, Port Chester, N. Y.

Warrant issued August 15, 1891; answered to September fifteenth. Pleaded guilty. Fined twenty-five dollars.

Witnesses: T. R. Gray, E. S. Wilson, and chemist, J. F. Geisler.

BOTTLE No. 2590.

THE PEOPLE v. CLAUS.

Justice Tighe's Police Court, Brooklyn, N. Y.

Warrant issued August 7, 1891; answered to August eighth. Pleaded guilty. Fined twenty-five dollars.

Witnesses: T. R. Gray, J. J. Sorogan, and chemist, J. F. Geisler.

BOTTLE No. 2602.**THE PEOPLE v. HARE.***Justice Sutherland's Court, Coney Island, N. Y.*

Warrant issued August 11, 1891; answered to September tenth.
Pleaded guilty. Fined twenty-five dollars.

Witnesses: Arch. D. Clark, W. W. Meeteer, and chemist, J. F. Geisler.

BOTTLE No. 2571.**THE PEOPLE v. DITTMAN.***Justice Nicoll's Court, Babylon, N. Y.*

Warrant issued August 27, 1891; answered to August thirtieth.
Pleaded guilty. Fined twenty-five dollars.

Witnesses: W. W. Meeteer, Arch. D. Clark, and chemist, J. F. Geisler.

BOTTLE No. 2592.**THE PEOPLE v. HOFFMAN,***Justice Hunold's Court, College Point, N. Y.*

Warrant issued September 8, 1891; answered to September eleventh. Pleaded guilty. Fined twenty-five dollars.

Witnesses: T. R. Gray, E. S. Wilson, and chemist, C. M. Stillwell.

BOTTLE No. 2603.**THE PEOPLE v. SPELLARBERG.***Justice Nicoll's Court, Babylon, N. Y.*

Warrant issued August 12, 1891; answered to August twenty-sixth; adjourned to September ninth. Tried by jury. Acquitted.
Counsel, T. M. Griffing.

Witnesses: Arch. D. Clark, W. W. Meeteer, and Chemist J. F. Geisler.

BOTTLE No. 2917.

THE PEOPLE v. BLANCK.

Supreme Court, New York County.

Summons and complaint issued December 19, 1890; returnable January 2, 1891.

Counsel, La Roy S. Gove.

Witnesses: Arch. D. Clark, George W. Price, W. W. Meeteer, and Chemist T. S. Gladding.

Remarks: "This case was brought for the civil penalty of \$100 and costs, and was settled by payment of same to attorney La Roy S. Gove, one-half of which fine was forwarded to the State Treasurer, one-fourth to treasurer New York fire department relief fund, and one-fourth to treasurer New York police pension fund.

BOTTLE No. 2586.

THE PEOPLE v. GRUNDY.

Justice Carman's Court, Patchogue, N. Y.

Warrant issued August 14, 1891; answered to August twenty-sixth; adjourned to October seventh.

Counsel, T. M. Griffing.

Witnesses: Arch. D. Clark, T. R. Gray, and Chemist Thos. S. Gladding.

BOTTLE No. 2548.

THE PEOPLE v. BEAKS.

Essex Market Police Court, New York City.

Warrant issued May 7, 1891; answered to May 8, 1891; adjourned to twelfth for examination; adjourned to June first, to third, and held to bail for trial at General Sessions.

Counsel, La Roy S. Gove.

Witnesses: W. W. Meeteer, G. W. Price, and Chemist J. F. Geisler.

BOTTLE No. 2554.

THE PEOPLE v. KEYKENDALL.

Supreme Court, New York County.

Summons and complaint issued February 13, 1891; returnable March 4, 1891.

Counsel, Barnard and Olendorf.

Witnesses: T. R. Gray, J. J. Sorogan, and chemist, T. S. Gladding.

Remarks: "This case was brought for the civil penalty of \$100 and costs, and was settled by defendant paying same to F. E. Barnard, attorney for Dairy Commission. One-half of which fine was forwarded to the State Treasurer, one-fourth to treasurer fire department relief fund, and one-fourth to treasurer New York police pension fund."

BOTTLE No. 2821.

THE PEOPLE v. HUSTED.

Justice Goetting's Police Court, Brooklyn, N. Y.

Warrant issued September 17, 1891; answered to September eighteenth. Pled guilty. Fined twenty-five dollars.

Witnesses: E. S. Wilson, T. R. Gray, and Chemist J. F. Geisler.

BOTTLE No. 2563.

THE PEOPLE v. GOOSSEN.

Justice Goetting's Police Court, Brooklyn, N. Y.

Warrant issued January 15, 1891; answered to January seventeenth. Pled guilty. Fined twenty-five dollars.

Witnesses: E. S. Wilson, W. W. Meeteer, and chemist, J. F. Geisler.

The result of the fifty-five preceding prosecutions for violations

of the milk law commenced between September 30, 1890, and September 30, 1891, were as follows:

Convicted on trial, or pleading guilty	45
Awaiting trial at Special Sessions	4
Acquitted at Special Sessions	5
Complaints dismissed on examination	1
Total	55
Total fines imposed	\$1,425 00

The following tables give a detailed report of work performed by each employe in this division of the department between September 30, 1890, and September 30, 1891, in enforcing the laws relating to the sale of adulterated milk:

William W. Meeteer, expert, employed in the above service 145 days:

Number of days in court	54
Number of days inspecting milk	50
Number of days obtaining evidence	20
Number of days inspecting herds	19
Number of days on special duty	2
Total number of days	145

Number of creamerymen's milk inspected	84
Number of stores inspected	905
Number of dairies' milk inspected at creameries and rail-road depots	583
Number of peddler's milk inspected	337
Number of inspections of stables	107
Number of cows inspected	2,375
Total number of milk inspections	6,194
Total number of samples delivered to chemists	25
Total number of complaints made	18
Total number of appearances in cases	78
Estimated number of miles traveled	6,162

Edmund S. Wilson, expert, employed in the above service 197 days:

Number of days in court	45
Number of days inspecting milk	57
Number of days obtaining evidence	45
Number of days on special duty	12
Number of days inspecting herds	38
Total number of days	197
Number of creamerymen's milk inspected	7
Number of dairies' milk inspected on delivery at creameries and railroad depots	562
Number of stores inspected	976
Number of peddlers' milk inspected	181
Number of inspections of stables	241
Number of cows inspected	1,590
Total number of milk inspections	7,611
Total number of samples delivered to chemists	17
Total number of complaints made	8
Total number of appearances in cases	62
Estimated number of miles traveled	7,465

Archibald D. Clark, expert, employed in the above service 123 days:

Number of days in court	28
Number of days inspecting milk	37
Number of days obtaining evidence	26
Number of days on special duty	31
Number of days inspecting herds	1
Total number of days	123
Number of creamerymen's milk inspected	58
Number of stores inspected	646
Number of dairies' milk inspected on delivery at creameries and railroad depots	516
Number of inspections of stables	2
Number of cows inspected	64

Number of peddlers' milk inspected.....	251
Total number of milk inspections.....	5,035
Total number of samples delivered to chemists.....	7
Total number of complaints made	7
Total number of appearances in cases.....	45
Estimated number of miles traveled.....	4,900

Thomas R. Gray, expert, employed in the above service 197 days:

Number of days in court.....	57
Number of days inspecting milk.....	67
Number of days obtaining evidence.....	39
Number of days on special duty.....	5
Number of days inspecting herds.....	29
Total number of days.....	197

Number of creamerymen's milk inspected.....	7
Number of stores inspected.....	1,165
Number of dairies' milk inspected on delivery at cream- eries and railroad depots.....	595
Number of peddlers' milk inspected.....	265
Number of inspections of stables.....	227
Number of cows inspected.....	1,401
Total number of milk inspections.....	7,241
Total number of samples delivered to chemists.....	27
Total number of complaints made.....	22
Total number of appearances in cases.....	99
Estimated number of miles traveled.....	6,860

Joseph J. Sorogan, expert, employed in the above service fifty-nine days:

Number of days in court.....	9
Number of days inspecting milk.....	18
Number of days obtaining evidence.....	14
Number of days on special duty.....	6
Number of days inspecting herds.....	12
Total number of days.....	59

Number of creamerymen's milk inspected at railroad and steamboat depots	19
Number of stores inspected.....	332
Number of dairies' milk inspected on delivery at creameries and railroad depots.....	564
Number of stables inspected.....	138
Number of cows inspected.....	2,820
Number of peddlers' milk inspected.....	138
Total number of milk inspections.....	2,714
Total number of samples delivered to chemists.....	2
Total number of complaints.....	.....
Total number of appearances in cases.....	9
Estimated number of miles traveled.....	2,273

Joseph F. Geisler, Ph. C.:

Number of analyses of milk samples.....	34
Number of appearances in cases.....	23
Number of days in court.....	10

Edward G. Love, Ph. D.:

Number of analyses of milk samples.....	4
Number of appearances in cases.....	28
Number of days in court.....	12

Charles M. Stillwell, A. M., and Thomas S. Gladding, A. M.:

Number of analyses of milk samples.....	40
Number of appearances in cases.....	20
Number of days in court.....	10

Cook & Salmon, counsel:

Number of cases prosecuted.....	6
Number of cases disposed of.....	6
Number of convictions.....	6
Number of acquittals.....	0
Number of appearances in cases.....	14
Number of days in court.....	9

Barnard and Olendorf, counsel:

Number of cases prosecuted.....	3
Number of cases disposed of.....	2
Number of convictions.....	2
Number of acquittals	0
Number of appearances in cases.....	7
Number of days in court.....	5

Benjamin W. Downing, counsel:

Number of cases prosecuted.....	3
Number of cases disposed of.....	3
Number of convictions.....	0
Number of acquittals	3
Number of appearances in cases.....	9
Number of days in court.....	6

La Roy S. Gove, counsel:

Number of cases prosecuted.....	4
Number of cases disposed of.....	3
Number of convictions.....	2
Number of cases dismissed on examination in police court	1
Number of appearances in court.....	13
Number of days in court.....	11

T. N. Griffing, counsel:

Number of cases prosecuted.....	2
Number of cases disposed of.....	1
Number of convictions.....	0
Number of acquittals.....	1
Number of appearances in court.....	2
Number of days in court.....	1

David Swits, counsel:

Number of cases prosecuted.....	3
Number of cases disposed of.....	3
Number of convictions.....	3
Number of appearances in cases.....	5
Number of days in court.....	4

William Wyckoff, counsel:

Number of cases prosecuted.....	1
Number of cases disposed of.....	1
Number of convictions.....	1
Number of appearances in cases.....	2
Number of days in court.....	1

TOTAL (Milk).

Number of days, experts.....	721
Number of days in court (experts, counsel and chemists),	262
Number of days inspecting milk.....	229
Number of days obtaining evidence.....	144
Number of days on special duty.....	56
Number of days inspecting herds.....	99
Number of milk inspections.....	28,195
Number of dairies' milk inspected.....	2,820
Number of stores inspected.....	4,024
Number of peddlers' milk inspected.....	1,172
Number of creamerymen's milk inspected.....	175
Number of inspections of stables.....	715
Number of cows inspected.....	8,250
Number of samples delivered to chemists.....	78
Number of complaints made.....	55
Number of appearances in cases.....	356
Number of analyses of samples of milk.....	78
Number of cases prosecuted.....	55
Number of cases disposed of.....	51
Number of cases not disposed of.....	4
Number of convictions.....	45
Number of acquittals.....	5
Number of cases dismissed from calendar.....	1
Estimated number of miles traveled.....	27,660

Daily Average Receipts in New York, Per Week, of Cans of Forty Quarts each of Milk, Condensed Milk and Cream, as taken from the Milk Reporter.

	WEEK ENDING OCT. 7.			WEEK ENDING OCT. 14.			WEEK ENDING OCT. 21.			WEEK ENDING OCT. 28.		
	Milk.	Cream.	Condensed.	Milk.	Cream.	Condensed.	Milk.	Cream.	Condensed.	Milk.	Cream.	Condensed.
New York, Lake Erie and Western	4,330	181	33	4,164	159	31	4,149	132	31	4,080	100	33
New York Central and Hudson River	2,140	4	43	2,147	4	60	2,133	4	63	2,316	4	63
New York, Ontario and Western	2,040	143	.....	2,133	140	.....	2,145	114	.....	2,015	77	.....
New York, Susquehanna and Western	1,408	13	.....	1,412	17	.....	1,397	15	.....	1,390	13	.....
New York and Northern	1,067	.....	.....	1,067	.....	.....	1,067	.....	.....	1,067	.....	.....
New York, New Haven and Hartford	746	.....	.....	745	.....	.....	762	.....	.....	760	.....	.....
West Shore	861	34	33	831	36	72	836	39	65	847	32	73
New Jersey Central	323	.....	.....	323	.....	.....	323	.....	.....	323	.....	.....
Homer Ramsdell "T." Company	770	45	.....	770	45	.....	770	45	.....	770	45	.....
Delaware and Lackawanna (M. & E. Div.)	1,433	.....	.....	1,433	.....	.....	1,433	.....	.....	1,432	.....	.....
Long Island	331	.....	.....	331	.....	.....	331	.....	.....	331	.....	.....
Miscellaneous	678	.....	.....	678	.....	.....	678	.....	.....	678	.....	.....
Totals	16,046	430	137	16,103	401	163	16,093	339	159	15,909	371	167

EIGHTH ANNUAL REPORT OF THE

Daily Average Receipts in New York, Per Week, of Cans of Forty Quarts each of Milk, Condensed Milk and Cream, as taken from the Milk Reporter — (Continued).

	WEEK ENDING NOV. 4.			WEEK ENDING NOV. 11.			WEEK ENDING NOV. 18.			WEEK ENDING NOV. 25.		
	Milk.	Cream.	Condensed.	Milk.	Cream.	Condensed.	Milk.	Cream.	Condensed.	Milk.	Cream.	Condensed.
New York, Lake Erie and Western.....	4,000	135	34	4,342	180	31	4,084	137	31	4,135	119	32
New York Central and Hudson River	2,345	4	61	2,127	4	54	2,115	4	63	2,205	4	63
New York, Ontario and Western.....	1,990	87	.....	2,132	177	.....	2,094	103	.....	2,100	102	.....
New York, Susquehanna and Western.....	1,373	12	.....	1,413	18	.....	1,393	11	.....	1,410	18	.....
New York and Northern	1,000	.....	.....	1,000	.....	.....	1,000	.....	.....	1,000	.....	.....
New York, New Haven and Hartford.....	757	.....	.....	765	.....	.....	763	.....	.....	765	.....	.....
West Shore.....	844	26	54	887	37	75	880	31	67	880	26	70
New Jersey Central	300	33	.....	300	33	.....	300	33	.....	300	33	.....
Homer Ramsdell "T." Company.....	894	32	.....	894	32	.....	894	32	.....	894	32	.....
Delaware and Lackawanna (M. and E. Div.).....	1,334	.....	.....	1,334	.....	.....	1,334	.....	.....	1,334	.....	.....
Long Island.....	349	.....	.....	349	.....	.....	349	.....	.....	349	.....	.....
Miscellaneous	700	.....	.....	700	.....	.....	700	.....	.....	700	.....	.....
Totals	15,689	239	179	16,194	481	163	15,836	331	161	16,044	334	165

Daily Average Receipts in New York, Per Week, of Cans of Forty Quarts each of Milk, Condensed Milk and Cream, as taken from the Milk Reporter—(Continued).

	WEEK ENDING DEC. 2.			WEEK ENDING DEC. 9.			WEEK ENDING DEC. 16.			WEEK ENDING DEC. 23.		
	Milk.	Cream.	Condensed.	Milk.	Cream.	Condensed.	Milk.	Cream.	Condensed.	Milk.	Cream.	Condensed.
New York, Lake Erie and Western	3,960	108	33	4,309	202	32	4,118	132	31	4,122	120	32
New York Central and Hudson River	2,310	4	61	2,103	3	49	2,163	4	52	2,169	4	68
New York, Ontario and Western	1,950	64	.....	2,106	176	.....	2,106	118	.....	2,126	110	.....
New York, Susquehanna and Western	1,367	12	.....	1,412	14	.....	1,404	16	.....	1,408	18	.....
New York and Northern	1,000	.....	.....	1,550	.....	.....	1,550	.....	.....	1,550	.....	.....
New York, New Haven and Hartford	750	.....	.....	745	.....	.....	755	.....	.....	758	.....	.....
West Shore	843	19	71	874	43	83	833	28	70	874	25	67
New Jersey Central	451	8	.....	451	8	.....	451	8	.....	451	8	.....
Homer Ramsdell "T." Company .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Delaware and Lackawanna (M. and E. Div.)	580	.....	.....	580	.....	.....	580	.....	.....	580	.....	.....
Long Island	366	.....	.....	366	.....	.....	366	.....	.....	366	.....	.....
Miscellaneous	790	.....	.....	790	.....	.....	790	.....	.....	790	.....	.....
Totals	14,367	210	135	15,285	446	164	15,165	306	153	15,199	285	167

EIGHTH ANNUAL REPORT OF THE

Daily Average Receipts in New York, Per Week, of Cans of Forty Quarts each of Milk, Condensed Milk and Cream, as taken from the Milk Reporter—(Continued).

	WEEK ENDING DEC. 30.			WEEK ENDING JAN. 6.			WEEK ENDING JAN. 13.			WEEK ENDING JAN. 20.		
	Milk.	Cream.	Condensed.	Milk.	Cream.	Condensed.	Milk.	Cream.	Condensed.	Milk.	Cream.	Condensed.
New York, Lake Erie and Western	3,098	99	34	4,344	172	88	4,187	172	81	4,114	186	81
New York Central and Hudson River	2,838	4	62	2,228	4	54	2,138	4	58	2,134	4	57
New York, Ontario and Western	1,937	67	.....	2,000	130	.....	2,156	163	.....	2,127	118	.....
New York, Susquehanna and Western	1,368	10	.....	1,332	18	.....	1,419	18	.....	1,368	14	.....
New York and Northern	1,550	.....	.....	1,452	.....	.....	1,452	.....	.....	1,452	.....	.....
New York, New Haven and Hartford	748	.....	.....	735	.....	.....	749	.....	.....	751	.....	.....
West Shore	842	19	67	857	34	79	881	36	75	887	30	65
New Jersey Central	451	8	.....	389	8	.....	389	9	.....	389	9	.....
Homor Ramsdell "T." Company .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Delaware and Lackawanna (M and F. Div.)	580	.....	.....	1,355	.....	.....	1,355	.....	.....	1,355	.....	.....
Long Island	366	.....	.....	357	.....	.....	357	.....	.....	357	.....	.....
Miscellaneous	730	.....	.....	678	.....	.....	678	.....	.....	678	.....	.....
Totals	15,008	207	163	15,632	366	166	15,716	391	164	15,573	310	163

Daily Average Receipts in New York, Per Week, of Cans of Forty Quarts each of Milk, Condensed Milk and Cream, as taken from the Milk Reporter — (Continued).

	WEEK ENDING FEB. 2.			WEEK ENDING FEB. 9.			WEEK ENDING FEB. 16.			WEEK ENDING FEB. 23.		
	Milk.	Cream.	Condensed.	Milk.	Cream.	Condensed.	Milk.	Cream.	Condensed.	Milk.	Cream.	Condensed.
New York, Lake Erie and Western	3,970	116	33	4,309	303	32	4,360	133	31	4,122	135	32
New York Central and Hudson River	2,430	7	20	2,102	4	49	2,162	4	52	2,169	4	68
New York, Ontario and Western	1,906	80	.....	2,105	176	.....	2,106	118	.....	2,126	110	.....
New York, Susquehanna and Western	1,395	14	.....	1,413	14	.....	1,404	16	.....	1,403	18	.....
New York and Northern	1,500	.....	.....	1,500	.....	.....	1,500	.....	.....	1,500	.....	.....
New York, New Haven and Hartford	714	.....	.....	745	.....	.....	754	.....	.....	787	.....	.....
West Shore	980	19	120	875	43	88	847	31	70	874	26	67
New Jersey Central	333	8	.....	333	8	.....	333	8	.....	323	8	.....
Homer Ramsdell "T." Company .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Delaware and Lackawanna (M. and E. Div.)	1,300	.....	.....	1,300	.....	.....	1,300	.....	.....	1,300	.....	.....
Long Island	143	.....	.....	143	.....	.....	143	.....	.....	143	.....	.....
Miscellaneous	678	.....	.....	678	.....	.....	678	.....	.....	678	.....	.....
Totals	15,392	244	173	15,463	446	164	15,467	310	153	15,386	301	167

EIGHTH ANNUAL REPORT OF THE

Daily Average Receipts in New York, Per Week, of Cans of Forty Quarts each of Milk, Condensed Milk, and Cream, as taken from the Milk Reporter — (Continued).

	WEEK ENDING MARCH 2.			WEEK ENDING MARCH 9.			WEEK ENDING MARCH 16.			WEEK ENDING MARCH 23.		
	Milk.	Cream.	Condensed.	Milk.	Cream.	Condensed.	Milk.	Cream.	Condensed.	Milk.	Cream.	Condensed.
New York, Lake Erie and Western	4,084	170	35	4,338	176	31	4,108	135	31	4,110	113	33
New York Central and Hudson River	2,305	6	42	2,132	4	56	2,115	4	59	2,306	4	66
New York, Ontario and Western	1,975	117	.....	2,145	164	.....	2,106	116	.....	2,083	87	.....
New York, Susquehanna and Western	1,417	15	.....	1,414	19	.....	1,392	12	.....	1,406	16	.....
New York and Northern	1,176	.....	.....	1,176	.....	.....	1,172	.....	.....	1,159	.....	.....
New York, New Haven and Hartford	780	.....	.....	747	.....	.....	750	.....	.....	766	.....	.....
West Shore	965	33	137	890	35	75	876	29	65	949	27	71
New Jersey Central	323	.....	.....	323	.....	.....	323	.....	.....	323	.....	.....
Homer Ramsdell "T." Company .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Delaware and Lackawanna (M. and E. Div.)	1,390	.....	.....	1,390	.....	.....	1,390	.....	.....	1,390	.....	.....
Long Island	334	81	.....	334	81	.....	334	81	.....	334	81	.....
Miscellaneous	678	.....	.....	678	.....	.....	678	.....	.....	678	.....	.....
Totals	15,327	422	214	15,467	479	162	15,144	377	155	15,303	323	170

Daily Average Receipts in New York, Per Week, of Cans of Forty Quarts each of Milk, Condensed Milk and Cream, as taken from the Milk Reporter—(Continued).

	WEEK ENDING MARCH 30.			WEEK ENDING APRIL 7.			WEEK ENDING APRIL 14.			WEEK ENDING APRIL 21.		
	Milk.	Cream.	Condensed.	Milk.	Cream.	Condensed.	Milk.	Cream.	Condensed.	Milk.	Cream.	Condensed.
New York, Lake Erie and Western	3,930	104	35	4,212	190	32	4,164	153	32	4,150	132	32
New York Central and Hudson River	2,423	6	16	2,167	5	36	2,147	4	60	2,134	4	63
New York, Ontario and Western	1,397	82	.....	2,019	143	.....	2,132	140	.....	2,146	114	.....
New York, Susquehanna and Western	1,397	14	.....	1,412	19	.....	1,411	17	.....	1,397	15	.....
New York and Northern	1,154	.....	.....	1,180	.....	.....	1,170	.....	.....	1,156	.....	.....
New York, New Haven and Hartford	711	.....	.....	733	.....	.....	744	.....	.....	762	.....	.....
West Shore	1,005	18	17	896	34	36	881	36	72	886	25	65
New Jersey Central	323	9	.....	223	9	.....	323	9	.....	323	9	.....
Homer Ramsdell "T." Company .....	.....	.....	.....	645	.....	.....	645	.....	.....	645	.....	.....
Delaware and Lackawanna (M. and E. Div.)	1,390	.....	.....	1,390	.....	.....	1,390	.....	.....	1,390	.....	.....
Long Island	334	81	.....	300	.....	.....	300	.....	.....	300	.....	.....
Miscellaneous	673	.....	.....	673	.....	.....	673	.....	.....	673	.....	.....
Totals	15,143	314	63	15,574	400	144	15,386	364	164	15,370	339	160

EIGHTH ANNUAL REPORT OF THE

Daily Average Receipts in New York, Per Week, of Cans of Forty Quarts each of Milk, Condensed Milk and Cream, as taken from the Milk Reporter—(Continued).

	WEEK ENDING APRIL 28.			WEEK ENDING MAY 5.			WEEK ENDING MAY 12.			WEEK ENDING MAY 19.		
	Milk.	Cream.	Condensed.	Milk.	Cream.	Condensed.	Milk.	Cream.	Condensed.	Milk.	Cream.	Condensed.
New York, Lake Erie and Western	4,088	100	33	5,000	229	40	5,080	240	40	5,040	225	40
New York Central and Hudson River	2,017	4	56	2,570	7	75	2,580	7	78	2,580	7	77
New York, Ontario and Western	1,905	77	.....	2,442	202	.....	2,440	205	.....	2,445	200	.....
New York, Susquehanna and Western	1,300	12	32	1,673	85	.....	1,670	80	.....	1,680	85	.....
New York and Northern	1,160	.....	.....	1,283	.....	.....	1,280	.....	.....	1,249	.....	.....
New York, New Haven and Hartford	750	.....	.....	710	.....	.....	715	.....	.....	705	.....	.....
West Shore	845	22	72	1,540	25	100	1,535	25	102	1,540	25	103
New Jersey Central	323	9	.....	225	10	.....	224	10	.....	220	10	.....
Homer Ramsdell "T." Company	645	.....	.....	650	.....	.....	655	.....	.....	650	.....	.....
Delaware and Lackawanna (M. and E. Div.)	1,200	.....	.....	1,200	.....	.....	1,246	.....	.....	1,200	.....	.....
Long Island	300	.....	.....	223	.....	.....	225	.....	.....	220	.....	.....
Miscellaneous	678	16	.....	700	17	.....	710	19	.....	726	20	.....
Totals	16,429	225	193	18,427	545	215	18,499	616	218	18,564	542	220

Daily Average Receipts in New York, Per Week, of Cans of Forty Quarts each of Milk, Condensed Milk and Cream, as taken from the Milk Reporter — (Continued).

	WEEK ENDING MAY 30.			WEEK ENDING JUNE 2.			WEEK ENDING JUNE 9.			WEEK ENDING JUNE 16.		
	Milk.	Cream.	Condensed.	Milk.	Cream.	Condensed.	Milk.	Cream.	Condensed.	Milk.	Cream.	Condensed.
New York, Lake Erie and Western.....	5,033	242	40	4,727	333	36	4,750	330	40	4,770	330	39
New York Central and Hudson River.....	2,571	7	77	2,305	49	61	2,350	49	60	2,400	47	59
New York, Ontario and Western.....	2,450	205	.....	2,330	303	.....	2,340	310	.....	2,345	297	.....
New York, Susquehanna and Western.....	1,680	22	.....	1,723	38	.....	1,720	37	.....	1,740	37	.....
New York and Northern	1,250	.....	.....	1,243	.....	.....	1,200	.....	.....	1,260	.....	.....
New York, New Haven and Hartford.....	720	.....	.....	691	.....	.....	695	.....	.....	700	.....	.....
West Shore.....	1,545	35	105	1,036	43	103	1,030	43	102	1,100	45	100
New Jersey Central	335	10	.....	407	10	.....	470	9	.....	435	10	.....
Homer Ramsdell "T." Co.	670	.....	.....	1,035	.....	.....	1,040	.....	.....	1,045	.....	.....
Delaware and Lackawanna (M. & E. Div.).....	1,350	.....	.....	3,100	.....	.....	3,100	.....	.....	3,030	.....	.....
Long Island.....	340	.....	.....	208	.....	.....	300	.....	.....	300	.....	.....
Miscellaneous	740	19	.....	833	30	.....	830	30	.....	835	30	.....
Totals	18,733	550	222	19,846	801	200	22,535	707	202	22,770	706	193

EIGHTH ANNUAL REPORT OF THE

Daily Average Receipts in New York, Per Week, of Cans of Forty Quarts each of Milk, Condensed Milk and Cream, as taken from the Milk Reporter — (Continued).

	WEEK ENDING JUNE 23.			WEEK ENDING JUNE 30.			WEEK ENDING JULY 7.			WEEK ENDING JULY 14.		
	Milk.	Cream.	Condensed.	Milk	Cream.	Condensed.	Milk.	Cream.	Condensed.	Milk.	Cream.	Condensed.
New York, Lake Erie and Western	4,750	325	89	4,760	330	40	4,437	264	29	4,430	260	29
New York Central and Hudson River	2,400	47	59	2,375	45	55	1,500	4	54	1,888	5	55
New York, Ontario and Western	2,345	300	.....	2,340	307	.....	2,430	242	.....	2,422	245	.....
New York, Susquehanna and Western	1,740	37	.....	1,735	35	.....	1,630	34	.....	1,680	35	.....
New York and Northern	1,200	.....	.....	1,25	.....	.....	1,100	.....	.....	1,101	.....	.....
New York, New Haven and Hartford	700	.....	.....	700	.....	.....	640	.....	.....	635	.....	.....
West Shore	1,100	44	98	1,095	42	95	1,070	40	105	1,066	39	110
New Jersey Central	485	10	.....	480	9	.....	400	8	.....	405	8	.....
Homer Ramsdell "T." Company	1,045	.....	.....	1,050	34	.....	1,100	35	.....	1,102	37	.....
Delaware and Lackawanna (M. and E. Div.)	3,090	.....	.....	3,095	.....	.....	3,335	.....	.....	3,380	.....	.....
Long Island	390	.....	.....	380	.....	.....	329	.....	.....	328	.....	.....
Miscellaneous	830	20	.....	825	19	.....	770	.....	.....	770	.....	.....
Totals	20,135	783	196	18,090	721	190	19,021	637	188	19,037	639	194

Daily Average Receipts in New York, Per Week, of Cans of Forty Quarts each of Milk, Condensed Milk and Cream, as taken from the Milk Reporter—(Continued).

	WEEK ENDING JULY 31.			WEEK ENDING JULY 28.			WEEK ENDING AUG. 5.			WEEK ENDING AUG. 12.		
	Milk.	Cream.	Condensed.	Milk.	Cream.	Condensed.	Milk.	Cream.	Condensed.	Milk.	Cream.	Condensed.
New York, Lake Erie and Western.....	4,480	262	29	4,435	265	30	8,612	200	26	4,341	239	28
New York Central and Hudson River.....	1,890	5	55	1,888	5	57	1,642	8	40	1,612	4	58
New York, Ontario and Western.....	2,422	245	.....	2,425	244	.....	2,273	183	.....	2,439	228	.....
New York, Susquehanna and Western.....	1,680	34	.....	1,635	36	.....	1,458	35	.....	1,462	44	.....
New York and Northern.....	1,105	.....	.....	1,102	.....	.....	976	.....	.....	983	.....	.....
New York, New Haven and Hartford.....	635	.....	.....	640	.....	.....	528	.....	.....	530	.....	.....
West Shore.....	1,070	38	109	1,067	39	110	978	82	95	982	48	96
New Jersey Central.....	409	9	.....	400	8	.....	401	9	.....	405	8	.....
Homer Ramdell "T." Company.....	1,124	40	.....	1,150	42	.....	900	33	.....	900	30	.....
Delaware and Lackawanna (M. and E. Div.).....	3,330	.....	.....	3,335	.....	.....	3,660	.....	.....	3,667	.....	.....
Long Island.....	229	.....	.....	380	.....	.....	198	.....	.....	196	.....	.....
Miscellaneous.....	775	2	.....	720	2	.....	770	2	.....	767	2	.....
Totals.....	16,110	625	193	19,137	641	197	17,466	497	161	17,364	763	182

EIGHTH ANNUAL REPORT OF THE

Daily Average Receipts in New York, Per Week, of Cans of Forty Quarts each of Milk, Condensed Milk and Cream, as taken from the Milk Reporter—(Continued).

	WEEK ENDING AUG. 19.			WEEK ENDING AUG. 26.			WEEK ENDING SEPT. 2.			WEEK ENDING SEPT. 9.		
	Milk.	Cream.	Condensed.	Milk.	Cream.	Condensed.	Milk.	Cream.	Condensed.	Milk.	Cream.	Condensed.
New York, Lake Erie and Western	4,318	210	26	4,118	193	26	3,946	103	27	4,088	178	30
New York Central and Hudson River	1,334	3	63	1,543	3	37	1,726	3	58	1,806	3	56
New York, Ontario and Western	2,597	268	.....	2,530	293	.....	2,400	104	.....	2,386	146	.....
New York, Susquehanna and Western	1,451	31	.....	1,452	26	.....	1,415	30	.....	1,446	33	.....
New York and Northern	936	.....	.....	912	.....	.....	918	.....	.....	948	.....	.....
New York, New Haven and Hartford	520	.....	.....	513	.....	.....	500	.....	.....	507	.....	.....
West Shore	970	27	122	970	33	106	902	24	73	926	26	68
New Jersey Central	400	9	.....	400	8	.....	500	.....	.....	500	.....	.....
Homer Ramsdell "T." Company	900	33	.....	900	33	.....	888	29	.....	881	29	.....
Delaware and Lackawanna (M. and E. Div.)	3,367	.....	.....	3,36*	.....	.....	3,940	50	.....	3,960	50	.....
Long Island	196	.....	.....	195	.....	.....	216	.....	.....	215	.....	.....
Miscellaneous	707	2	.....	770	2	.....	.....	.....	.....	.....	.....	.....
Totals	17,696	613	210	17,758	600	169	18,091	462	156	17,361	475	154*

Daily Average Receipts in New York, Per Week, of Cases of Forty Quarts each of Milk, Condensed Milk and Cream, as taken from the Milk Reporter—(Concluded).

	WEEK ENDING SEPT. 16.			WEEK ENDING SEPT. 23.			WEEK ENDING SEPT. 30.		
	Milk.	Cream.	Condensed.	Milk.	Cream.	Condensed.	Milk.	Cream.	Condensed.
New York, Lake Erie and Western	4,086	209	28	4,227	106	25	4,230	185	26
New York Central and Hudson River.....	1,574	4	66	1,910	4	85	1,900	4	80
New York, Ontario and Western.....	2,433	159	.....	2,647	191	.....	2,645	185	.....
New York, Susquehanna and Western.....	1,445	40	.....	1,453	44	.....	1,450	40	.....
New York and Northern	945	.....	.....	953	.....	.....	960	.....	.....
New York, New Haven and Hartford.....	530	.....	.....	534	.....	.....	535	.....	.....
West Shore.....	933	27	66	936	33	65	930	30	60
New Jersey Central	500	.....	.....	495	.....	.....	495	.....	.....
Home'r Ramsdell "T." Company	800	43	.....	893	33	.....	890	32	.....
Delaware and Lackawanna (M. and E. Div.).....	3,950	50	.....	3,945	50	.....	3,940	42	.....
Long Island	216	.....	.....	216	.....	.....	220	.....	.....
Miscellaneous	870	.....	.....	800	.....	.....	795	.....	.....
Totals	18,532	532	160	19,066	551	175	19,040	538	166

Total Receipts over all Roads for the Year Ending September 30, 1891.

	Cans milk.	Cans cream.	Cans condensed milk.	Estimated value, freight included.	Average market price to producer.	Platform price.
October	513,767	7,451	5,357	\$950,000	9%	1.35
November	491,495	7,803	5,351	940,000	9%	1.60
December	474,084	6,577	5,573	975,000	9%	1.60
January	513,039	6,511	6,393	1,020,000	3	1.45
February	484,048	7,149	2,331	1,000,000	3	1.40
March	500,548	7,451	6,318	1,000,000	9%	1.35
April	538,398	11,138	6,313	1,035,000	9%	1.35
May	515,310	15,979	6,016	1,000,000	9%	1.30
June	562,073	23,295	6,019	892,195	3	1.30
July	570,795	18,894	5,755	815,519	3	1.30
August	555,409	17,471	5,035	937,305	9%	1.30
September	557,081	15,051	4,373	890,063	9%	1.39
	6,305,795	144,193	69,939	\$11,504,677	.....	.....

HERDS AND STABLES.

Special attention has been given during the year to the inspection of stables in the suburbs of New York and Brooklyn, in which cows were kept for the production of milk for market, to see whether or not they were in proper condition and to learn whether they were kept or fed in violation of law. The stables, in nearly every case, have been found in good condition. Whenever a stable was found to be in an unhealthy condition, the attention of the owner was called to the matter and on later inspection, the stable has been found to be in proper condition, the food that the cows were subsisting on was wholesome in nearly all cases when inspections were made. There is a marked improvement in the general condition of the stables and the cows, as well as in the quality of the food given to the cows, in this division, as compared with the condition they were found in several years ago, when the Dairy Commission made the first inspection under the dairy law. During the year there has been 715 inspections of stables and 8,250 examinations of cows.

Aside from the examination of cows in stables in the suburbs of the cities, a large number of herds have been inspected and in all cases the cows have appeared to be in a healthy condition; so far as we have been able to discover, there has been no pleuropneumonia among the herds of cows in this division to call for special attention during the year, although there have been a few isolated cases in which one or two cows in a herd have been sick which have been slaughtered by the owner for safety without definite knowledge as to whether the disease was pleuropneumonia, tuberculosis or some other disease.

REPORT ON VINEGAR.

During the year considerable attention has been given to enforcing the law relating to adulterated vinegar; several parties have been found selling vinegar in violation of law and were prosecuted, but, as a whole, the standard of vinegar sold in this division of the department has greatly improved since the present law went into effect.

The short crop of apples in 1890, and consequent short supply of cider, causing extremely high prices for pure cider vinegar, has been a great inducement to retailers to infringe on the law, still very few of them have been willing to risk prosecution. So far as we have been able to discover, by inspections made, not one store in 100 has handled adulterated vinegar. The following list of cases prosecuted will show in detail how they were disposed of.

The status of the following seven prosecutions for violation of the law relating to adulterated vinegar was fully stated to you in my seventh annual report; the final disposition of five of them and present status of two remaining untried is given in the annexed table.

Bottle number.	NAMES.	Called for trial.	Court.	City.	Result.	Fined.
119.....	The People v. O'Connor ..	January 18, 1891	Special Sessions.....	Yonkers, N. Y.....	Acquitted .....	.....
120.....	The People v. Drury	October 17, 1890	Special Sessions.....	Yonkers, N. Y.....	Acquitted .....	.....
121.....	The People v. Delahanty ..	February 8, 1891	Special Sessions.....	Yonkers, N. Y.....	Convicted* .....	.....
122.....	The People v. Bieslerfield ..	December 11, 1890	Special Sessions.....	New York	Convicted	\$50 00
123.....	The People v. Seebeck	November 30, 1890	General Sessions	New York .....	† .....	.....
29.....	The People v. Hopke	November 11, 1890	Special Sessions.....	Brooklyn, N. Y.....	Acquitted .....	.....
124.....	The People v. Edesheimer ..	.....	General Sessions	New York .....	† .....	.....

* Sentence suspended.

† Bail forfeited.

‡ Awaiting trial.

The following statement represents prosecutions commenced under chapter 515, Laws of 1889, relating to the sale of adulterated vinegar and the present status of the cases:

BOTTLE No. 45.

THE PEOPLE v. HETTERS.

Jefferson Market Police Court, New York City.

Warrant issued December 27, 1890; answered to December twenty-ninth; held to bail for trial at Special Sessions. Called for trial January 5, 1891. Pleaded guilty. Fined fifty dollars.

Counsel, Barnard & Olendorf.

Witnesses: J. J. Sorogan, T. R. Gray, and chemist, J. F. Geisler.

BOTTLE No. 47.

THE PEOPLE v. PAPE.

Justice Goetting's Police Court, Brooklyn, N. Y.

Warrant issued January 15, 1891; answered to January sixteenth; adjourned to February seventeenth, and tried. Convicted. Fined fifty dollars.

Counsel, A. C. Salmon.

Witnesses: W. W. Meeteer, E. S. Wilson, and chemist, J. F. Geisler.

BOTTLE No. 48.

THE PEOPLE v. HAGGERTY.

Justice Walsh's Police Court, Brooklyn, N. Y.

Warrant issued January 17, 1891; answered to January twentieth. Pleaded guilty. Fined fifty dollars.

Witnesses: W. W. Meeteer, E. S. Wilson, and chemist, E. G. Love.

BOTTLE No. 49.

THE PEOPLE v. GOING.

Justice Walsh's Police Court, Brooklyn, N. Y.

Warrant issued January 17, 1891; answered to January twentieth. Pleaded guilty. Fined fifty dollars.

Witnesses: W. W. Meeteer, E. S. Wilson, and chemist, E. G. Love.

BOTTLE No. 61.

THE PEOPLE v. KROEPKE.

Morrisania Police Court, New York City.

Warrant issued July 14, 1891; answered to July fifteenth; held to bail for trial at Special Sessions.

Witnesses: J. J. Sorogan, W. W. Meeteer, and chemist, J. F. Geisler.

BOTTLE No. 52.

THE PEOPLE v. HAMMOND.

Justice Curman's Court, Patchogue, N. Y.

Warrant issued August 14, 1891; answered to ———, —. Adjourned to ———, —, for examination.

Counsel, T. M. Griffing.

Witnesses: Arch. D. Clark, T. R. Gray, and chemist, T. S. Gladding.

BOTTLE No. 50.

THE PEOPLE v. CLAUSEN.

Justice Walsh's Police Court, Brooklyn, N. Y.

Warrant issued January 17, 1891; answered to January twentieth; adjourned to twenty-eighth and pleaded guilty. Fined fifty dollars.

Counsel, Cook & Salmon.

Witnesses: W. W. Meeteer, E. S. Wilson, and chemist, T. S. Gladding.

BOTTLE No. 65.

THE PEOPLE v. ARMSTRONG.

Justice Goetting's Police Court, Brooklyn, N. Y.

Warrant issued July 9, 1891; answered to July tenth; adjourned to seventeenth, to twenty-third. Pled guilty. Fined fifty dollars.

Counsel, Cook & Salmon.

Witnesses: J. J. Sorogan, W. W. Meeteer, and chemist, J. F. Geisler.

BOTTLE No. 72.

THE PEOPLE v. LUYSTER.

Justice Steinhut's Court, Hicksville, N. Y.

Warrant issued August 13, 1891; answered to August twenty-fifth. Pled guilty. Fined fifty dollars.

Witnesses: W. W. Meeteer, Arch. D. Clark, and chemist, E. G. Love.

BOTTLE No. 75.

THE PEOPLE v. GRASHORN.

Justice Sutherland's Court, Coney Island, N. Y.

Warrant issued August 11, 1891; answered to September tenth. Pled guilty. Fined fifty dollars.

Witnesses: W. W. Meeteer, Arch. D. Clark, and chemist, J. F. Geisler.

BOTTLE No. 73.

THE PEOPLE v. BRUSH.

Justice Hendrixson's Court, Huntington, N. Y.

Warrant issued September 23, 1891; answered to ————; adjourned to ————, for examination.

Counsel, T. M. Griffing.

Witnesses: Arch. D. Clark, W. W. Meeteer, and chemist, J. F. Geisler.

BOTTLE No. 66.

THE PEOPLE v. SPARM.

Justice Tighe's Police Court, Brooklyn, N. Y.

Warrant issued September twenty-ninth; answered to ———; held to bail for trial at Special Sessions.

Witnesses: J. J. Sorogan, T. R. Gray, and chemist, J. F. Geisler.

The following is a detail of the work performed in this department between September 30, 1890, and September 30, 1891, in prosecuting the law relating to vinegar:

Joseph J. Sorogan, expert, employed in the above service 192 days:

Number of days in court.....	59
Number of days obtaining evidence.....	40
Number of days on special duty.....	30
Number of days inspecting vinegar in stores.....	42
Number of days inspecting wholesale dealers and manufacturers	21

Total number of days.....	192
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Number of samples purchased and taken.....	12
Number of samples delivered to chemists.....	12
Number of appearances in cases.....	62
Number of complaints made.....	4
Number of wholesale dealers and manufacturers inspected	39
Number of stores inspected.....	532
Total number of vinegar inspections.....	1,023
Estimated number of miles traveled.....	7,174

W. W. Meeteer, expert, employed in the above service forty days:

Number of days in court.....	18
Number of days obtaining evidence.....	0
Number of days on special duty.....	0
Number of days inspecting vinegar in stores.....	15
Number of days inspecting wholesale dealers and manufacturers	7

Total number of days.....	40
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Number of samples purchased and taken.....	5
Number of samples delivered to chemists.....	5
Number of appearances in cases.....	21
Number of complaints made.....	5

Number of wholesale dealers and manufacturers inspected	63
Number of stores inspected.....	440
Total number of vinegar inspections.....	740
Estimated number of miles traveled.....	1,219

E. S. Wilson, expert, employed in the above service seventeen days:

Number of days in court.....	8
Number of days obtaining evidence.....	0
Number of days on special duty.....	0
Number of days inspecting vinegar in stores.....	9
Number of days inspecting wholesale dealers and manufacturers	0
Total number of days.....	17

Number of samples purchased and taken.....	0
Number of samples delivered to chemists.....	0
Number of appearances in cases.....	9
Number of complaints made.....	0
Number of wholesale dealers and manufacturers inspected	0
Number of stores inspected.....	420
Total number of vinegar inspections.....	692
Estimated number of miles traveled.....	726

T. R. Gray, expert, employed in the above service thirteen days:

Number of days in court.....	1
Number of days obtaining evidence.....	1
Number of days on special duty.....	0
Number of days inspecting vinegar in stores.....	11
Number of days inspecting wholesale dealers and manufacturers	0
Total number of days.....	13

NEW YORK STATE DAIRY COMMISSIONER.

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Number of samples purchased and taken.....	0
Number of samples delivered to chemists.....	0
Number of appearances in cases.....	1
Number of complaints made.....	0
Number of wholesale dealers and manufacturers in- spected	0
Number of stores inspected.....	761
Total number of vinegar inspections.....	994
Estimated number of miles traveled.....	545

A. D. Clark, expert, employed in the above service twenty-one days:

Number of days in court.....	7
Number of days obtaining evidence.....	3
Number of days on special duty.....	1
Number of days inspecting vinegar in stores.....	10
Number of days inspecting wholesale dealers and manufacturers	0
Total number of days.....	21

Number of samples purchased and taken.....	5
Number of samples delivered to chemists.....	5
Number of appearances in cases.....	7
Number of complaints made.....	3
Number of wholesale dealers and manufacturers inspected	0
Number of stores inspected.....	462
Total number of vinegar inspections.....	708
Estimated number of miles traveled.....	645

Joseph F. Geisler, Ph. C.:

Number of analyses of vinegar samples.....	14
Number of appearances in cases.....	30
Number of days in court.....	20

Edward G. Love, Ph. D.:

Number of analyses of vinegar samples.....	3
Number of appearances in cases.....	4
Number of days in court.....	3

Charles M. Stillwell, A. M., and Thomas S. Gladding, A. M.:

Number of analyses of vinegar samples.....	4
Number of appearances in cases.....	0
Number of days in court.....	0

Cook & Salmon, counsel:

Number of cases prosecuted.....	3
Number of cases disposed of.....	3
Number of convictions.....	3
Number of appearances in cases.....	6
Number of days in court.....	5

Barnard & Olendorf, counsel:

Number of cases prosecuted.....	1
Number of cases disposed of	1
Number of convictions.....	1
Number of appearances in cases.....	6
Number of days in court.....	4

TOTAL (Vinegar).

Number of days experts.....	283
Number of days in court, experts, counsel and chemists..	125
Number of days obtaining evidence.....	44
Number of days special duty.....	31
Number of days inspecting vinegar.....	107
Number of samples purchased and taken.....	22
Number of samples delivered to chemist.....	22
Number of vinegar samples analyzed.....	21
Number of appearances in cases.....	146
Number of complaints made.....	12
Number of wholesale dealers and manufacturers in- spected.....	102
Number of stores inspected.....	2,615
Number of vinegar inspections.....	4,157

Estimated number of miles traveled.....	10,309
Number of cases prosecuted.....	12
Number of cases disposed of.....	8
Number of cases convicted.....	8
Number of cases not disposed of.....	4

The result of the twelve preceding prosecutions for violations of the vinegar law commenced between September 30, 1890, and September 30, 1891, were as follows:

Convicted at Special Sessions.....	8
Awaiting trial at Special Sessions.....	4

Total	12
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Total fines imposed in above cases.....	\$400 00
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The final result of prosecutions under the laws relating to oleomargarine, adulterated milk and vinegar, for the year ending September 30, 1891, were as follows:

Oleomargarine cases remaining untried September 30, 1890 .....	.....
Milk cases remaining untried September 30, 1890	13
Vinegar cases remaining untried September 30, 1890....	7

Total cases remaining untried September 30, 1890..	20
Oleomargarine cases prosecuted during the year ending September 30, 1891	17
Milk cases prosecuted during the year ending September 30, 1891	55
Vinegar cases prosecuted during the year ending September 30, 1891	12

Total number of cases	104
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Convicted	76
Acquitted	12
Dismissed from calendar	4
Remaining on calendar awaiting trial	11
Bail forfeited	1

Total	104
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Total fines imposed during the year (vinegar).....	\$450
Total fines imposed during the year (oleomargarine).....	850
Total fines imposed during the year (milk)	1,600
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Total	\$2,900
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In conclusion, I am greatly pleased to state that I have been supported to the full extent of their ability by each of the State experts, chemists and counsel employed in this division of the dairy department, also by the experts detailed to assist in this division by Assistant Dairy Commissioner Tuthill, and wish to add that the district attorneys and their able assistants have forwarded our prosecutions to a favorable termination; and the judges of the different courts, in which prosecutions have been brought, have given the work of this department prompt and careful attention.

Respectfully submitted,

B. F. VAN VALKENBURGH,

New York State Assistant Dairy Commissioner.

Report of F. D. Tuthill.

Hon. JOSIAH K. BROWN, *New York State Dairy Commissioner*
Albany, N. Y.:

Sir.—The following report of work performed in the third department of the Dairy Commission during the year ending September 30, 1891, is respectfully submitted.

The business of the year just closed varied but little from the one preceding, excepting, that the number of prosecutions and convictions, have, I am pleased to state, been considerably less.

In my last report were returned fifty-nine convictions, classified as follows: Twenty-eight farmers, fourteen creamerymen, thirteen milk-peddlers, and four dealers in oleomargarine. In the present but fourteen farmers and five creamerymen, showing that the Dairy Commission has by its work in the past produced good results, the quality of milk increasing in standard and the number of adulterations being but few; many farmers throughout the counties of Delaware, Ulster and Sullivan, who heretofore have been shipping milk are now engaged in butter making; such a course, if continued, should naturally lessen the shipments of milk, therefore, in the end prove beneficial.

Another thing noticeable in the past season which also must help reduce the surplus of milk was the falling off in demand for cows, fully fifty per cent less having been sold than the year previous, so with less cows to produce from, less feed to buy, and less money invested, there is good reason to predict better times for the farmer and better prices for milk and butter in the future.

In the month of August my attention was directed to the mixture which is used quite extensively in the manufacture of ice cream and prepared by the "Union Dairy Company" at Searsville, Orange county. It was said that it had been marketed at such prices as would warrant suspicion of some adulteration, I therefore caused a sample of the same to be taken for analysis, and reported below:

NEW YORK, *August 21, 1891.*

MR. F. D. TUTHILL:

Dear Sir.—The sample of cream "AX," in my opinion, contains gelatine. I worked several days endeavoring to find a more satisfactory method for identifying gelatine, but the best method I could employ gave reactions in pure milk after the separation of the albumen, which indicated a substance somewhat like gelatine, possibly 0.1 per cent. The cream, however, contained fully five times as much of the substance, which I considered to be gelatine. I am conducting some investigations and will advise you further in regard to this.

Very respectfully,

J. F. GEISLER.

NEW YORK, *September 30, 1891.*

MR. F. D. TUTHILL, *Washingtonville, Orange county, N. Y.:*

Dear Sir.—Regarding the further investigations made to identify gelatine in milk, I found that all the methods applicable for the removal of albuminous matter from milk in the presence of gelatine left sufficient albumen in solution to give a precipitate with reagents intended to precipitate the gelatine only. The precipitate thus obtained from pure milk is very slight. In the milk, pure, which I used, it amounted to only one-twentieth to one-tenth of the quantity found when one-half per cent of gelatine had been added to the milk. The cream "AX" in the quantity and character of precipitate acted like milk to which gelatine had been added.

In my opinion said sample of cream contained gelatine as already stated in my letter of August 22, 1891.

Very respectfully,

J. F. GEISLER.

On learning that the dairy of Alvah Hyatt, near Carmel, Putnam county, was supposed to be infected with tuberculosis, and had been quarantined by the health board, I sent two experts with

Professor Geisler to investigate. A report of the same is given below:

F. D. TUTHILL, *Assistant N. Y., State Dairy Commissioner:*

Sir.—In obedience to instructions received from you we went to Carmel, in company with Prof. J. F. Geisler, on the fifteenth of April, and, on the morning of the sixteenth, drove to the farm of Mr. Alvah Hyatt. Arrived there at 5.50 a. m. and were conducted through the building and shown the herd by Mr. Hyatt. Found the cattle all stabled and eating hay, which Mr. H. informed us was the only feed the cattle received.

The cattle, with two exceptions, were young, and, from outward appearances, seemed healthy; eyes clear and noses moist. Mr. Hyatt said the dairy had been quarantined. There were sixty-one head in all. But fourteen were being milked, and the milk fed to swine on the premises. No milk was sold. Samples were taken separately from each of two cows that were condemned; also three samples from a mixture of the entire dairy, one of which was given to Prof. Geisler for analysis. The balance of the samples he took for examination under the microscope, the results of which will be duly reported by him to the Dairy Commissioner.

Dated *April 18, 1891.*

Respectfully yours, etc.

GEORGE W. PRICE,
ARCH. D. CLARK,
Experts.

NEW YORK, *April 22, 1891.*

Mr. F. D. TUTHILL, *Assistant N. Y., State Dairy Commissioner:*

Dear Sir.—I report herewith the results of the examination of five samples of milk taken from the herd of cows of Alvah Hyatt, Carmel, Putnam county, N. Y., on the morning of April 16, 1891; in presence of Messrs. Geo. W. Price, Arch. D. Clark and myself; the herd was quarantined at the time, as there was reason to believe that the herd was infected with tuberculosis. The samples taken represented:

AO, average milk of herd; A, from old cow; B, from two-year-old heifer; C and D, average milk of herd.

As far as the ordinary constituents of milk are concerned, the results of the analysis of samples AO, reported on separate blank, do not disclose any irregularities.

Special biological examination was made of the samples A, B, C, D, with a view of ascertaining the presence of tubercle bacilli, but in none of the samples taken were any of the bacilli found, even after a most careful examination. Failure to find the bacilli is, however, not conclusive evidence of their absence since, when present in very small quantity in milk, they may escape detection in a biological examination. As already stated the examination of these samples of milk failed to disclose any evidence of the infection of the milk of these cows by tubercle bacilli.

Very respectfully.

J. F. GEISLER.

Oleomargarine.

The sale and use of oleomargarine in this department has greatly diminished, although there are still some violations of the law. The decision regulating the sale in unbroken packages makes it difficult to get proof in the majority of cases. The dealers use greater precaution in shipment than heretofore. The usual mode of incasing in burlap has been improved upon, by using smaller packages and inclosing the same in the common dairy tub. By so doing there seems to be but little chance of detection unless extraordinary efforts are made by the expert to disclose the contents of the packages suspected. A close watch has been kept during the past season by the experts, and numbers of packages followed, but in nearly every instance they were en route through the State.

Vinegar.

Out of about 325 stores inspected, but ten samples of vinegar were taken, and in each case the analysis showed adulteration. Four of these were presented to the grand jury, but no indictments found. Two were tried before juries and acquitted, one pleaded guilty. The three remaining I have decided to take no action on, as I am advised by attorneys with whom I have consulted that the law does not give courts of special sessions juris-

diction of these cases. Repeated failures to convict under the law as at present constituted, have a tendency to embarrass the experts in the performance of their duties. I would suggest a change by giving courts of special sessions full jurisdiction as in section 14, chapter 183, laws of 1885.

The following tables give a detailed report of work performed by each employe in this division of the department between September 30, 1890, and October 1, 1891:

Report of R. H. Palmer for year:

Number of days in court.....	17
Number of days inspecting milk, butter and vinegar....	158
Number of days inspecting herds.....	8
Number of days obtaining evidence.....	10
Number of days on special duty.....	59

Total number of days.....	252
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Number of creameries inspected as to condition.....	32
Number of condenseries inspected as to condition.....	1
Number of cheese factories.....	
Number of milk peddlers.....	53
Number of stores, restaurants and hotels.....	485
Number of packages of butter inspected.....	1,998
Number of stables inspected.....	19
Number of cows inspected.....	863
Number of creamerymen's milk inspected.....	25
Number of dairymen's milk inspected.....	1,420

Number cans of creamerymen's milk inspected.....	2,071
Number cans of dairymen's milk inspected.....	6,194
Number cans of peddlers' milk inspected.....	278
Number cans of store peddlers' milk inspected.....	27

Total number cans of milk inspected.....	8,570
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Total number samples of milk delivered to chemist.....	4
Total number samples of vinegar delivered to chemist..	3
Total number of milk complaints made.....	4
Total number of vinegar complaints made.....	.....
Estimated number miles traveled.....	14,680

Report of Geo. W. Price for year:

Number of days in court	21
Number of days inspecting milk, butter and vinegar....	133
Number of days inspecting herds	3
Number of days obtaining evidence	18
Number of days on special duty	120

Total number of days	295
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Number of creameries inspected as to condition	32
Number of condenseries inspected as to condition.....	3
Number of cheese factories inspected	7
Number of milk peddlers inspected as to condition.....	40
Number of stores, restaurants and hotels inspected.....	324
Number of packages of butter inspected	1,640
Number of stables inspected	3
Number of cows inspected	157
Number of creamerymen's milk inspected	40
Number of dairymen's milk inspected	2,584

Number cans of creamerymen's milk inspected.....	2,440
Number cans of dairymen's milk inspected	8,750
Number cans of peddlers' milk inspected	216
Number cans of store peddlers' milk inspected	17

Total number cans milk inspected	11,453
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Total number samples of milk delivered to chemist.....	8
Total number samples of vinegar delivered to chemist...	2
Total number milk complaints made	6
Total number vinegar complaints made.....	.....
Estimated number miles traveled	12,600

Report of T. C. DuBois for year:

Number of days in court	20
Number of days inspecting milk, butter and vinegar....	164
Number of days inspecting herds .....	.....
Number of days obtaining evidence	33
Number of days on special duty	31

Total number of days	248
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Number of creameries inspected as to condition.....	34
Number of condenseries inspected as to condition.....	1
Number of cheese factories inspected as to condition... ..	.....
Number of milk peddlers inspected	92
Number of stores, restaurants and hotels inspected.....	319
Number of packages of butter inspected	1,689
Number of stables inspected .....	.....
Number of cows inspected .....	.....
Number of creamerymen's milk inspected	40
Number of dairymen's milk inspected	2,270
Number cans of creamerymen's milk inspected.....	2,610
Number cans of dairymen's milk inspected.....	5,520
Number cans of peddlers' milk inspected.....	317
Number cans of store milk inspected	2

Total number cans milk inspected	8,149
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Total number samples of milk delivered to chemist.....	8
Total number samples of vinegar delivered to chemist...	5
Total number of milk complaints made.....	3
Total number of vinegar complaints made	7
Estimated number of miles traveled.....	14,375

Report of A. D. Clark for year:

Number of days in court	3
Number of days inspecting milk, butter and vinegar....	10
Number of days inspecting herds	1
Number of days obtaining evidence	12
Number of days on special duty	1

Total number of days	27
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Number of creameries inspected as to condition.....
Number of condenseries inspected as to condition.,....
Number of cheese factories inspected as to condition...	.....
Number of milk peddlers .....	.....
Number of stores, restaurants and hotels .....	.....
Number of packages of butter inspected .....	.....
Number of stables inspected	1
Number of cows inspected	61
Number of creamerymen's milk inspected	12
Number of dairymen's milk inspected.....	105

Number cans of creamerymen's milk inspected	870
Number cans of dairymen's milk inspected.....	439
Number cans of peddlers' milk inspected.....	....
Number cans of store milk inspected.....

Total number cans of milk inspected	1,309
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Total number of samples of milk delivered to chemist....	1
Total number samples of vinegar delivered to chemist..
Total number milk complaints made.....	....
Total number vinegar complaints made .....	....
Estimated number miles traveled	1,346

Report W. W. Meeteer, for year:

Number of days in court	3
Number of days inspecting milk, butter and vinegar...	15
Number of days inspecting herds .....	....
Number of days obtaining evidence	2
Number of days on special duty .....	....

Total number of days	20
----------------------------	----

Number of creameries inspected as to condition .....	....
Number of condenseries inspected as to condition .....	....
Number of cheese factories inspected as to condition...	....
Number of milk peddlers inspected as to condition.....	4
Number of stores, restaurants and hotels inspected....	38

Number of packages of butter inspected .....	....
Number of stables inspected .....	....
Number of cows inspected .....	....
Number of creamerymen's milk inspected	14
Number of dairymen's milk inspected	112

Number cans of creamerymen's milk inspected.....	2,481
Number cans of dairymen's milk inspected	673
Number cans of peddlers' milk inspected	14
Number cans of store milk inspected

Total number cans milk inspected.....	3,168
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Total number samples of milk delivered to chemist.....	9
Total number samples of vinegar delivered to chemist..
Total number milk complaints made	4
Total number vinegar complaints made .....	....
Estimated number miles traveled	1,660

Report of J. J. Sorogan for year:

Number of days in court .....	....
Number of days inspecting milk, butter and vinegar....	2
Number of days inspecting herds .....	....
Number of days obtaining evidence .....	...
Number of days on special duty .....	....

Total number of days	2
----------------------------	---

Number of creameries inspected as to condition.....	....
Number of condenseries inspected as to condition ....	..
Number of cheese factories inspected as to condition. .	....
Number of milk peddlers inspected as to condition.. .	5
Number of stores, restaurants and hotels inspected ...	1
Number of packages of butter inspected .....	....
Number of stables inspected .....	....
Number of cows inspected .....	....
Number of creamerymen's milk inspected.....	12
Number of dairymen's milk inspected	68

Number cans of creamerymen's milk inspected.....	218
Number cans of dairymen's milk inspected	196
Number cans peddlers' milk inspected.....	14
Number cans of store milk inspected	4
Total number cans milk inspected	432

Total number samples of milk delivered to chemist...	1
Total number samples of vinegar delivered to chemist..	....
Total number milk complaints made .....	....
Total number vinegar complaints made .....	....
Estimated number of miles traveled.....	680

Total report for year:

Number of days in court.....	64
Number of days inspecting milk, butter and vinegar....	482
Number of days inspecting herds.....	12
Number of days obtaining evidence.....	75
Number of days on special duty.....	211
Total number of days.....	844

Number of creameries inspected as to condition.....	98
Number of condenseries inspected as to condition.....	5
Number of cheese factories inspected as to condition....	7
Number of milk peddlers inspected.....	190
Number of stores, restaurants and hotels inspected....	1,166
Number of packages of butter inspected.....	5,327
Number of stables inspected.....	23
Number of cows inspected.....	1,081
Number of creamerymen's milk inspected.....	143
Number of dairymen's milk inspected.....	6,559
Number cans of creamerymen's milk inspected.....	10,690
Number cans of dairymen's milk inspected.....	21,772
Number cans of peddlers' milk inspected.....	869
Number cans of store milk inspected.....	50
Total number cans milk inspected.....	33,881
Total number samples milk delivered to chemist.....	81

Total number samples vinegar delivered to chemist....	10
Total number milk complaints made.....	17
Total number vinegar complaints made.....	7
Estimated number miles traveled.....	<u>45,341</u>

The following statement shows the number of prosecutions and how disposed of during the year.

MILK.

CASE No. 2954.

THE PEOPLE v. CAHILL.

Justice Sear's Court of Special Sessions.

Warrant issued September 21, 1891; answered to September 21, 1891. Pleaded guilty. Sentence suspended by the court.

Witnesses: T. C. DuBois, Geo. G. Price, and chemist, J. F. Geisler.

CASE No. 2941.

THE PEOPLE v. GRACE.

Recorder McCroskery Recorder's Court.

Warrant issued August 11, 1891; answered to August 11, 1891. Pleaded guilty. Sentence suspended by the court.

Witnesses: George W. Price, and chemist, Chas. M. Stillwell.

CASE No. 2934.

THE PEOPLE v. HUNTER.

Justice Crist's Court of Special Sessions.

Warrant issued May 12, 1891; answered to May 12, 1891. Pleaded guilty. Fined twenty-five dollars.

Witnesses: T. C. DuBois, John Cummings, and chemist, J. F. Geisler.

CASE No. 2535.

THE PEOPLE v. LAYMAN.

Justice Dart's Court of Special Sessions.

Warrant issued April 22, 1891; answered to April 22, 1891.
Pleaded guilty. Sentence suspended by the court.

Witnesses: Geo. W. Price, R. H. Palmer, and chemist, R. D. Clark.

CASE No. 2534.

PEOPLE v. FALEY.

Justice Denniston's Court of Special Sessions.

Warrant issued April 7, 1891; answered to April 9, 1891.
Pleaded guilty. Fined twenty-five dollars.

Witnesses: Geo. W. Price, R. H. Palmer, and chemist, J. F. Geisler.

Remarks: Fine was remitted by the court.

CASE No. 2533.

PEOPLE v. RIFENBARK.

Justice Gerow's Court of Special Sessions.

Warrant issued March 18, 1891; answered to March 18, 1891.
Pleaded guilty. Fined twenty-five dollars.

Witnesses: Geo. W. Price, R. H. Palmer, and chemist, J. F. Geisler.

CASE No. 2936.

THE PEOPLE v. KELLY.

Justice Crist's Court of Special Sessions.

Warrant issued March 11, 1891; answered to March 11, 1891.
Pleaded guilty. Fined twenty-five dollars.

Witnesses: T. C. DuBois, G. F. Van Houten, and chemist, J. F. Geisler.

CASE No. 2526.

THE PEOPLE v. PARSONS.

Justice Brook's Court of Special Sessions.

Warrant issued January 6, 1891; answered to January 6, 1891; adjourned to January 17, 1891; adjourned to February 10, 1891. Pled guilty. Fined twenty-five dollars.

Witnesses: George W. Price, R. H. Palmer, and chemist, J. F. Geisler.

CASE No. 2767.

THE PEOPLE v. MORRISON.

Recorder McCroskery, Recorder's Court.

Warrant issued January 17, 1891; answered to January 26, 1891; adjourned to February 12, 1891. Pled guilty. Fined twenty-five dollars.

Counsel, J. F. Graham.

Witnesses: Thomas R. Gray, T. C. DuBois, and chemist, Charles M. Stillwell.

CASE No. 2524.

THE PEOPLE v. WIXON.

Justice Brook's Court of Special Sessions.

Warrant issued November 28, 1890; answered to November 28, 1890. Pled guilty. Fined twenty-five dollars.

Witnesses: George W. Price, R. H. Palmer, chemist, J. F. Geisler.

CASE No. 2528.

THE PEOPLE v. MAPES.

Recorder Bradner, Recorder's Court.

Warrant issued January 30, 1891; answered to January 30, 1891. Pled guilty. Fined twenty-five dollars.

Witnesses: R. H. Palmer, George W. Price, chemist, J. F. Geisler.

CASE No. 2529.

THE PEOPLE v. S. C. MAPES.

Recorder Bradner, Recorder's Court.

Warrant issued, January 30, 1891; answered to January 30, 1891; adjourned to February 23, 1891; adjourned to March 19, 1891; adjourned to April 27, 1891; adjourned to July 3, 1891. Pleaded not guilty.

Counsel, W. Van Amee.

Witnesses: R. H. Palmer, George W. Price, chemist, J. F. Geisler.

Remarks: Tried before Recorder Bradner and jury, and acquitted by jury.

CASE No. 2183.

THE PEOPLE v. HILL.

Justice Hulse's Court of Special Sessions.

Warrant issued September 3, 1890; answered to September 12, 1890; adjourned to September 26, 1890; adjourned to October 3, 1890. Pleaded guilty. Fined twenty-five dollars.

Witnesses: T. C. DuBois, R. H. Palmer, chemist, J. F. Geisler.

CASE No. —

THE PEOPLE v. WRIGHT.

Justice Mulford's Court of Special Sessions.

Warrant issued November 18, 1890; answered to November 18, 1890. Pleaded guilty. Fined fifty dollars.

Witness: R. H. Palmer.

Remarks: This sample of milk was taken by Mr. Palmer, after having witnessed the adulteration of the same at creamery of defendant.

CASE No. 2188.

THE PEOPLE *v.* WEIRKE & Co.

Justice Parks' Court of Special Sessions.

Warrant issued October 8, 1890. Pleaded guilty. Fined twenty-five dollars.

Witnesses: Geo. W. Price, R. H. Palmer, chemist, J. F. Geisler.

CASE No. 2525.

THE PEOPLE *v.* SEELEY.

Justice Hawkins' Court of Special Sessions.

Warrant issued November 25, 1890; answered to November 29, 1890. Pleaded guilty. Fined twenty-five dollars.

Witnesses: R. H. Palmer, Geo. W. Price, and chemist, J. F. Geisler.

CASE No. 2539.

THE PEOPLE *v.* WILSON.

Justice Parks' Court of Special Sessions.

Warrant issued October 8, 1890; answered to April 13, 1891. Pleaded guilty. Fined twenty-five dollars; twenty dollars remitted by the court.

Witnesses: Geo. W. Price, R. H. Palmer, and chemist, J. F. Geisler.

CASE No. 2538.

THE PEOPLE *v.* WILSON.

Justice Parks' Court of Special Sessions.

Warrant issued October 8, 1890; answered to October 21, 1890. Pleaded guilty. Fined twenty-five dollars.

Witnesses: Geo. W. Price, R. H. Palmer, and chemist, J. F. Geisler.

CASE No. 1761.

THE PEOPLE v. BEAKES.

Justice Barnard, Supreme Court.

Summons issued January 17, 1890; answered to February 1, 1890. Pled not guilty.

Counsel, Greene & Bedell.

Witnesses: A. D. Clark, O. C. Griffin, and chemist, Thos. S. Gladding.

Remarks: Case tried before Justice Barnard and jury, November 10, 1890, and jury disagreed. Defendant paid \$100 and costs, June 8, 1891, and complaint withdrawn.

VINEGAR.

CASE No. 127.

THE PEOPLE v. MERRIHEW.

Recorder Hussey's Court.

Warrant issued June 9, 1891; answered to June 9, 1891; adjourned to July 6, 1891. Pled guilty. Fined fifty dollars.

Counsel, G. B. D. Hasbrouck.

Witnesses: T. C. DuBois, R. H. Palmer, and chemist, J. F. Geisler.

CASE No. 128.

THE PEOPLE v. MASON.

Recorder Hussey's Court.

Warrant issued June 9, 1891; answered to June 9, 1891; adjourned to July 7, 1891. Pled not guilty.

Counsel, G. B. D. Hasbrouck.

Witnesses: T. C. Du Bois, R. H. Palmer, and chemist, J. F. Geisler.

Remarks: Tried before Recorder Hussey and jury, and acquitted.

CASE No. 126.

THE PEOPLE v. KELLEY & DUMOND.

Recorder Hussey's Court.

Warrant issued June 9, 1891; answered to June 9, 1891.
Adjourned to July 8, 1891. Pled not guilty.

Counsel, G. B. D. Hasbrouck.

Witnesses: T. C. Du Bois, R. H. Palmer, and chemist, J. F. Geisler.

Remarks: Tried before Recorder Hussey and jury, and acquitted.

CASE No. 135.

THE PEOPLE v. WARD.

Recorder Morschauser's Court.

Warrant issued June 11, 1891; answered to June 23, 1891;
waived examination and gave bail for appearance before grand jury.

Counsel, Wilkinson & Cossum.

Witnesses: T. C. Du Bois, Geo. W. Price, and chemist, J. F. Geisler.

Remarks: Case was presented to grand jury August 3, 1891.
No bill found.

CASE No. 131.

THE PEOPLE v. SIEBGEN.

Recorder Morschauser's Court.

Warrant issued June 11, 1891; answered to June 23, 1891;
waived examination and gave bail for appearance before grand jury.

Counsel, Wilkinson & Cossum.

Witnesses: T. C. Du Bois, Geo. W. Price.

Remarks: Case was presented to grand jury August 3, 1891.
No bill found.

CASE No. 129.

THE PEOPLE v. JILLARD.

Recorder Morschauser's Court.

Warrant issued June 11, 1891; answered to June 23, 1891; waived examination and gave bail for appearance before grand jury.

Counsel, Wilkinson & Cossum.

Witnesses: T. C. Du Bois, Geo. W. Price, and chemist, J. F. Geisler.

Remarks: Case was presented to grand jury, August 3, 1891. No bill found.

CASE No. 130.

THE PEOPLE v. DRISLANE.

Recorder Morschauser's Court.

Warrant issued June 11, 1891; answered to June 23, 1891. Waived examination and gave bail for appearance before grand jury.

Counsel, Wilkinson & Cossum.

Witnesses: T. C. Du Bois, Geo. W. Price, and chemist, C. M. Stillwell.

Remarks: Case presented to grand jury, August 3, 1891. No bill found.

Very respectfully yours,

F. D. TUTHILL,

New York State Assistant Dairy Commissioner.

WASHINGTONVILLE, N. Y., October 1, 1891.

Report of P. J. Sutley.

CASTILE, N. Y., *November 25, 1891.*

HON. JOSIAH K. BROWN, *New York State Dairy Commissioner,*
Albany, N. Y.:

Sir.—I have the honor of submitting to you the following report of the transactions of the dairy department in this division, for the year ending September 30, 1891:

In October, 1890, the counties for some time theretofore under the charge and management of Assistant Dairy Commissioner Perry having been placed in my charge, I immediately, upon assuming that charge, made examinations of the various certificates of chemists' analyses, made of samples of milk taken in such counties, and found no less than fifty different adulterations of milk, supplied to cheese factories in the county of Allegany, to be manufactured into cheese, by various patrons thereof. I immediately thereafter commenced actions against fifteen of the worse cases of adulteration among the several offenders, some of which said actions are still pending and undetermined.

A detailed report of those otherwise disposed of, and the disposition made in each case, will hereafter more fully appear; upon investigation, I ascertained that the adulterations of milk, supplied to the various cheese factories in Allegany county, were caused by being diluted with water to no little extent. After the commencement of these actions by me, I was informed by several of the cheese-makers of these factories, that the supply of milk had fallen off at least fifteen per cent of the quantity theretofore supplied, and that the milk was of a much better quality in every way, thus showing that the practice of diluting milk supplied to these factories had been carried on to the amount of at least fifteen per cent. That, during the present season and since the prosecution of several actions above referred to, but little adulterating has been done in that locality, notwithstanding the fact that but few convictions have been had.

After demonstrating the fact that it was impossible to secure an indictment against these offenders, by ordinary grand jury of that county, I at once thereafter commenced civil actions, in the Supreme Court, against several of these offenders, which said actions, with the exception of two are now pending and undetermined. In pursuing this latter course, the trial jurors, before these actions will be tried, will be instructed by the court as to the law, etc. I apprehend no doubt as to the department being able to succeed in securing judgment against each of the defendants in these several civil actions. The number of farmers who deliver milk to creameries and cheese factories is on the increase, and therefore the work of the department increases accordingly. The patrons generally understand what causes low standard milk, other than by watering and skimming, and, therefore, take such care of their stock that a good quality of milk will be produced, while our frequent inspections are a preventive of willful adulterations and tend to encourage them to adopt the best method of keeping their stock. The larger number of patrons are honorable, and desire good wholesome butter and cheese from their milk.

A number of these patrons who have been detected in adulterating their milk, undoubtedly do so for the profit which they may gain thereby out of their brother patrons, and dilute their milk willfully with dishonesty of purpose, while others who have been detected in the adulteration of their milk, and convicted of the offense, maintain that the reason why they diluted their milk with water, was because their neighbor had been doing the same thing, and that they did not think it fair or just to themselves, that they deliver to the factory their pure and unadulterated milk, while their neighbors were realizing a greater profit with impure milk. While much has been said through the local press of Allegany county, pro. and con., as to the vigor of these prosecutions by the dairy department, of the offenders of the dairy laws, I dare say that our efforts to compel the manufacture of pure and wholesome butter and cheese in that county, is fully appreciated by the honest patrons of the various factories, as well as the cheese manufacturers and public generally.

There are over 125 creameries and cheese factories in my present district, comprising Wyoming, Genesee, Orleans, Livingston, Steuben, Chemung and Yates counties, all of which have been from time to time properly inspected. The proprietors and the greater number of patrons of these factories show their appreciation of the work of this department by aiding in the discovery of adulterated milk and the prosecution of the offenders.

While in the early history of the application of the dairy laws it was difficult for many of the farmers and patrons of butter and cheese factories to fully comprehend and understand the real purpose of the law; they, however, now understand quite generally that the dairy laws are a protection to them, and the good results that have come from their enforcement has convinced them that it was a wise enactment, and it is a complete protection against fraud and deception.

In this vicinity there are a number of factories making a high grade of cheese, the cheese being made for export trade; consequently have to compete with Canada cheese. What the managers of these combinations strive for, and desire to impress upon, the minds of the farmers and suppliers of milk to their several factories is the proper care of their milk by airing and cooling the same as soon as it is drawn from the cow.

This fact alone has had much to do with the advancement of the price in foreign markets of the cheese made in this vicinity. The butter factories or creameries in my district owned and operated by individuals, as well as the various cheese factories operated by individuals, are constantly improving in the manufacturing of butter and cheese. Owing to the fact that the patrons of the same have been and still are being educated to the fact that something more is necessary to be done with the milk after it is taken from the cows than merely pouring the same into a can and covering it up tightly and allowing it to stand inclosed therein until it is turned into the vat at the factory. Much credit should be given Messrs. Hall and Morgan, butter and cheese experts now in the employ of the dairy department, for the work which they have done in my district in enlightening the manu-

facturers in the art of butter and cheese making, as well as the patrons of the same, as to the proper method in caring for the milk previous to its being delivered to the factory.

Inspections of milk delivered at railroad stations for shipment to the cities have been numerous, and have been repeated in localities as often as possible, and whenever my suspicion has been aroused or complaints made, or where violations of the law had been previously prosecuted, and subsequent inspections were deemed necessary, this department has given such cases especial attention.

PROSECUTIONS.

The number of prosecutions is perhaps larger than last year but not as numerous as might have been, had I felt disposed or desirous of prosecuting each and every technical violation of the dairy laws that has come to my observation or notice.

I do not understand it to be the purpose of the department to persecute, but to prosecute where violations of the law are willful, or are required in the interest of the community, or to uphold and preserve the dignity of the law. When violations have been discovered, prosecutions have followed as soon as the processes of the court would permit, but oftentimes final issues in cases are long delayed, on grounds sufficient to the court, and for reasons not within the control of the department. The cases pending at the time of making my last report, together with the violations discovered, arraignments made, and dispositions had, and the outcome of prosecutions in my district during the last fiscal year are as follows:

SUPREME COURT—Allegany County.

THE PEOPLE *v.* FRANK AYLOE.

Civil action commenced November 10, 1890, to recover penalty of \$100, for adulterating milk supplied to a cheese factory. December 20, 1890, the defendant paid to O. P. Stockwell, attorney for the department, the sum of \$100 penalty for such violation, together with costs.

SUPREME COURT — Allegany County.

THE PEOPLE *v.* SIDNEY VINCENT.

Civil action commenced November 10, 1890, to recover penalty of \$100 for adulterating milk supplied to a cheese factory. December 20, 1890, the defendant paid to O. P. Stockwell, attorney for the department, the sum of \$100, penalty for such violation, together with costs.

THE PEOPLE *v.* MRS. THOMAS HOLLAND.

Sample of adulterated milk taken August 23, 1889. Case duly presented to the grand jury of Allegany county, January 5, 1891; no indictment found.

SUPREME COURT — Allegany County.

THE PEOPLE *v.* ADOLPH BRANNECA.

Sample of adulterated milk taken September 13, 1889. Civil action brought and now pending to recover the penalty of \$100 for supplying diluted milk to a cheese factory to be manufactured into cheese.

SUPREME COURT — Allegany County.

THE PEOPLE *v.* EDWARD HODNETT.

Sample of adulterated milk taken June 24, 1890. Civil action brought and now pending to recover the \$100 penalty prescribed by the statute, for supplying adulterated milk to a cheese factory to be manufactured into cheese.

THE PEOPLE *v.* JOHN BROWN.

Sample of adulterated milk taken June 25, 1890. Case presented to the grand jury of Allegany county, January 5, 1891, and that body declined to indict the accused.

THE PEOPLE *v.* JOHN DODGE.

Sample of adulterated milk taken June 25, 1890. The case was duly presented to the grand jury of Allegany county, January 5, 1891, and that body declined to indict the accused.

THE PEOPLE *v.* HENRY PHIPS.

Sample of adulterated milk taken June 26, 1890. Case duly presented to the grand jury of Allegany county, January 5, 1891. No indictment found.

THE PEOPLE *v.* ADELBERT GRUMMOND.

Sample of adulterated milk taken August 13, 1890. Case duly presented to the grand jury of Allegany county, and that body declined to indict the accused.

SUPREME COURT — Allegany County.

THE PEOPLE *v.* WILLIAM GRUMMOND.

Sample of adulterated milk taken August 13, 1890. Civil action brought and now pending to recover the penalty prescribed by the statute for supplying to a cheese factory adulterated milk.

THE PEOPLE *v.* BYRON VANDERBEAK.

Sample of adulterated milk taken August 16, 1890. Case duly presented to the grand jury of Allegany county, and no indictment found.

COURT OF SPECIAL SESSIONS — Allegany County.

THE PEOPLE *v.* TAFT AND PERRY.

Sample of adulterated milk taken September 3, 1890. On the 25th day of October, 1890, warrant issued by Justice Orminston, charging said Taft and Perry with supplying adulterated milk to a cheese factory to be manufactured into cheese.

Defendant Perry was arrested by virtue of said warrant, and brought before the court and pleaded not guilty, but at the same time stated that the milk had been diluted with water, but that one E. H. Stone had done the diluting, and that the said Perry had no further interest in or to said milk, than such as he required by virtue of a certain chattel mortgage, which he held upon the cows from which the milk was supposed to have been taken, and that the milk was put in the factory, in said Taft and Perry's names as owners thereof.

Believing this statement to be true I requested the court to dismiss the proceeding against the said Perry, with a view and determination of prosecuting the person or persons who actually did the diluting. Within a very few days after the dismissal of the proceedings above referred to, I was sued in the Supreme Court of Allegany county by said Perry, charging me with false imprisonment and malicious prosecution in causing his arrest. This last-mentioned action was duly brought on for trial at a circuit court, held in and for the county of Allegany, on the 5th day of January, 1891.

The court, after hearing the evidence of the plaintiff, at the request of the counsel for the department, directed a verdict in my favor and against the defendant, dismissing plaintiff's complaint; soon after the dismissal of the proceedings against said Taft and Perry, and after the bringing of the action against me by said Perry, I ascertained that the adulterated milk or the profits thereof was received jointly by said Taft and Perry from said factory, and that these two persons were the only persons interested in said adulterated milk; I did thereafter commence an action in the Supreme Court against said Taft and Perry to recover the penalty prescribed by the statute, and when said case was reached for trial it was found that our most material and necessary witness was absent from the State, or could not be found within the State. After due diligence on the part of this department to secure his attendance, and without which testimony of said absent witness the department was wholly unable to proceed with the trial thereof, the court dismissed said action. No further or other proceedings have as yet been taken therein.

COURT OF SPECIAL SESSIONS — Allegany County.**THE PEOPLE v. E. ONEAL.**

Sample of adulterated milk taken September 4, 1890. The said defendant was arrested and brought before said court October 25, 1890; pleaded not guilty, and gave bail to appear before the grand jury. January 5, 1891, said case was duly presented to the grand jury of Allegany county and no indictment found.

COURT OF SPECIAL SESSIONS — Allegany County.**THE PEOPLE v. BURCH & CHAMBERLIN.**

Sample of adulterated milk taken September 4, 1890. Defendant Burch arrested and brought before the court October 25, 1890, and pleaded not guilty, and gave bail to answer the disposition of the grand jury. January 5, 1891, this case was duly presented to the grand jury of said county and no indictment found.

SUPREME COURT — Steuben County.**THE PEOPLE v. RANDALL A. PEASE.**

Sample of adulterated milk taken October 11, 1890. Civil action brought and now pending to recover the penalty of \$100, as prescribed by the statute.

COURT OF SPECIAL SESSIONS — Chemung County.**THE PEOPLE v. E. & T. V. BUTTERS.**

Sample of adulterated milk taken October 30, 1890. On January 25, 1891, the defendants were arrested, and brought before court and pleaded not guilty, and gave bail to appear before the grand jury. March 30, 1891, said case was duly presented to the grand jury; no indictment found.

COURT OF SPECIAL SESSIONS — Chemung County.

THE PEOPLE *v.* CHARLES MILLER.

Sample of adulterated milk taken October 30, 1890. Same proceedings were had in this case, and the same disposition made, as the case of Butters, above mentioned.

COURT OF SPECIAL SESSIONS — Chemung County.

THE PEOPLE *v.* ERWIN CONKRITE.

Sample of adulterated milk taken October 30, 1890. Same proceedings had and disposition made as of the two cases last mentioned.

SUPREME COURT — Steuben County.

THE PEOPLE *v.* JOHN PORTER.

Sample of adulterated milk taken October 14, 1890. Civil action commenced, now pending to recover the penalty prescribed by the statute, for supplying adulterated milk to a cheese factory to be manufactured into cheese.

The following cases which were pending in Monroe county and noticed in my last report were disposed of as follows:

THE PEOPLE *v.* JAMES J. THOMPSON.

Warrant issued March 10, 1890; indicted June 10, 1890. The case was tried at Special Sessions in Rochester and conviction obtained. An appeal was taken by the accused to the General Term of the Supreme Court, held in Buffalo, June, 1891, which court reversed the conviction and granted a new trial; the decision was upon grounds precluding an appeal to the Court of Appeals. Upon another trial in the courts below, an application for an amendment of the decision, in order that an appeal to the Court of Appeals might be taken was denied, and we were, therefore, forced to abandon the case.

The People *v.* Thomas Eddy.*Police Court, Rochester, N. Y.*

The defendant had been convicted and appealed to the Court of Sessions in 1890, where conviction was sustained. He further appealed to the Supreme Court; that court sustained the decisions of the former courts, and a fine of fifty dollars was imposed. No warrants were issued for the collection of this fine, but the district attorney promises that if the same is not forthcoming at an early date he will issue an execution against Eddy.

Our experts have paid visits of inspection to the numerous creameries and cheese factories in this division during the year. A few samples taken late in the season have proven to have been adulterated, and I am preparing for the early prosecution of the guilty parties.

Fines.

The following fines were imposed and collected the past year:

Sidney Vincent	\$100 00
Frank Aylor	100 00
Total	<u>\$200 00</u>

Which was disposed of as follows:

Retained by Allegany county, in Vincent case.....	\$50 00
Retained by Allegany county, in Aylor case.....	50 00
Remitted to the State Treasurer.....	100 00
Total	<u>\$200 00</u>

On May 16, 1891, the department placed the supervision of the work in the counties of Allegany and Cattaraugus under the charge of J. W. McMahon.

Those cases pending at the time of the change I have continued and will keep charge of the same until they shall be fully determined.

Conclusion.

In conclusion, I desire to bear testimony to the faithfulness of the experts; to the attorney of this division, O. P. Stockwell, Esq., for his able conduct of the prosecutions placed in his hands; to the analytical chemist, Doctor F. P. Vanderburgh, for the aid of his professional skill in determining the standard of samples of food products submitted to him. For the many courtesies extended by yourself, you have my grateful acknowledgment.

Most respectfully yours,

PATRICK J. SUTLEY,

State Assistant Dairy Commissioner.

Report of J. H. Brown.

Hon. JOSIAH K. BROWN, *New York State Dairy Commissioner*:

Sir.—I have the honor to submit this my first annual report, as assistant dairy commissioner, for the division comprising the counties of St. Lawrence, Jefferson, Lewis, Oswego, Oneida and Herkimer, of the work performed during the year ending September 30, 1891.

I have been connected with this department, as assistant commissioner, since June, 1890, but have never submitted for your consideration a report of the work performed in this division, for the reason that much of the work heretofore done has been at your direction and under your personal supervision, this section having been previously assigned to yourself. Beginning, however, with this season, I have had almost entire charge of these counties, and the experts of this division, with such assistance as you have been from time to time able to render. These are large dairy counties, mainly producing milk to be manufactured into butter and cheese at creameries or cheese factories, and as what is known as the factory season closes about December first, it was thought best that the experts should not be employed during the winter months, and in accordance with this decision, I so wrote them. This, of course, left all the work of the division for myself, which I did until the factory season opened this spring. As there was no milk of any quantity being sold or produced during the winter months, I devoted all my time to the detection of the sale of oleomargarine and adulterated vinegar. I do not believe that oleomargarine is sold or used in these counties. Early in 1891, I visited Utica, N. Y., and made an inspection of vinegar sold by the wholesale dealers in that city and found them all, with one exception, selling only pure cider vinegar. I inspected this vinegar and found it was not up to the standard, and

informed them that it was a violation of our law to sell these goods and that no more must be sold. On April 13, 1891, I visited the same city inspecting the vinegar sold from retail stores, and found one sample below the standard, which was immediately taken to the chemist for analysis. Very soon thereafter I visited this city again and found several samples of vinegar below standard, all of which were purchased of the same firm. This matter I referred to you immediately; as you will undoubtedly remember, you met one of the members of this firm within a few days thereafter, and he agreed that they would no longer sell these goods, but would immediately begin to sell only pure cider vinegar. As this was, as I am informed and believe, the only firm in Utica at that time handling goods of this kind, and in consideration of this fact that they agreed to immediately stop the sale of these goods, it was thought best to begin no suits in the before-mentioned cases at that time.

About this time I visited Rome, N. Y., and inspected the vinegar sold there; found it to be nearly all good cider vinegar, some, however, not being up to the standard, and this I was informed by the dealers would be returned to the manufacturers.

I also visited many other of the cities and larger towns making inspections, and found most of the goods sold to be cider vinegar. In July, 1891, Mr. Legrange E. Scrafford was by you appointed a vinegar inspector and assigned to this district. Within a few weeks thereafter I made with him an inspection of the vinegar sold in Utica, he having previously spent several weeks in locating adulterated goods handled, and ascertaining of whom they were purchased. At all places visited, with one exception, we found vinegar below standard, and took samples for analysis.

These goods, very much to my surprise, were, in most cases, purchased of the wholesale house before mentioned, which had agreed to stop selling them.

These cases have been left with our attorneys, at Utica, for prosecution. I find that the sale of imitations of cider vinegar is quite general, and it seems almost impossible to break it up, although I believe it to be on the decrease very rapidly. If

the consumers would be satisfied with nothing but the pure article, and be willing to pay for a good vinegar what it is fairly worth, we would be able to hasten the downfall of the adulterated goods.

On January 1, 1891, Mr. William B. Howard, of Fulton, N. Y., was by you appointed an agent of this department for the county of Oswego, and immediately began the inspection of milk in that county. In August, 1891, Mr. R. H. Palmer, of Deposit, N. Y., an experienced expert of this department, was instructed by you to go into Oswego county and assist Mr. Howard, giving the county a thorough inspection. Below find a statement of the samples taken by them, which proved to be below standard upon analysis, viz.:

J. H. Cantwell, Phoenix; James Forth, Bowen's Corners; Michael Kennedy, Bowen's Corners; H. A. Clark, Pulaski; Herbert Keller, Mallory; Louis Bartler, Hastings.

As the work of these inspectors in this county continued up to and past the first of October, it was thought best to begin no actions until the close of the season, when I shall proceed against all persons in this county whose milk has been found to be below standard.

On August twenty-first, I received a letter from the Albany office, inclosing a communication from a gentleman in New York city, stating that a certain cheese-brand in this district was used upon what was supposed to be skim-cheese.

I immediately dispatched one of the experts of this department to the place named, who spent several days at and about this factory making as thorough an investigation of the place and surroundings as could possibly be made without attracting attention to his real purpose. He found that this factory was making a skim-cheese, and was also informed that they had made no full-cream cheese this season, and he was not able to find any trace of the brand having been used anywhere upon or about the building, or on any boxes or parts of boxes; neither could any person be found who had seen any State brand upon the cheese when shipped but learned that the proprietor had a brand of his own which he sometimes used.

Later in the season I sent another gentleman not connected with this department in search of any new information, but he was unable to report any new facts. About the only good to be derived from the use of the State brand lies in the fact that buyers know the goods bearing this brand are full-cream; if this belief or trust becomes in any way weakened, then the State brand immediately becomes almost worthless. In view of the great importance to the dealers, as well as the consumers and producers, that this brand be a perfect guarantee of the purity of the article bearing it, I believe it my duty to follow what little clue we now have to the end, and should I become convinced that there is any thing to this matter, I will begin proceedings against the proprietor of this factory, who was also the applicant for the brand.

In the counties of Oneida and Herkimer, applications for inspections of milk are generally made at the Utica board of trade, which meets every Monday, at Utica, N. Y., during the factory season. I have attended, with but two exceptions, every meeting of the board. We have responded promptly to every call, and I believe to the entire satisfaction of both the factorymen and the honest dairymen.

The following cases below our standard have been taken by Inspector W. G. Spence, this season, viz.: John Carr, Delta; James Dane, Deansville; Thomas Malone, Deansville; William Bailey, South Columbia; Frank Rayhill, Guelph; Marcus Johnson, Taberg; Delos W. Freeman, Leila; James J. Smith, Marcy.

These are all the cases taken which were below the standard in these counties this season excepting two, taken by Mr. Horace A. Rees, of Lowville, who has been at work in this department since July, 1891. The most of Mr. Rees' time has been devoted to cheese instruction but he has also inspected milk at nearly all the factories in Lewis county and has also helped the inspections in this and Oswego county. Below find a statement of the cases taken by him which were below standard, viz.: H. W. Cook, Boonville; John Forbes, Boonville; Charles Alexander, Martinsburgh; Frank Johnson, Martinsburgh.

Mr. Charles S. Kellogg, of Watertown, N. Y., an expert who has been in the employ of this department since it was first organized,

has had charge of the work in Jefferson county, and his reports show that he has been constantly at work for the whole season and has made a factory inspection nearly every day. Jefferson county has been so thoroughly looked after during the past seasons that very little attempt at adulteration is made; this is a very large dairy county, comprising over 100 large cheese and butter factories, and Mr. Kellogg has visited nearly all these factories at least once and in many cases more times this season.

Below find a statement of the cases taken by him which are below standard upon analysis, viz.: William Jolley, Theresa, N. Y.; William Killbourn, Montague, N. Y.; Charles Robinson, Antwerp, N. Y.

There were, besides the above, some samples taken which, owing to the long distance they had to be carried, in order to reach a chemist, spoiled before they could be analyzed; this fact is very much to be regretted, but is one of the many obstacles we are obliged to contend with.

In St. Lawrence county we have had two agents for a part of this season, viz.: Thomas Byrnes, of DePeyster, and Robert Daltzell, of Waddington. Owing to the fact that we could get no competent chemist, who would act for the first part of the season, no samples were taken. Inspections were made and doubtful samples were closely examined, the owners warned of its condition and cautioned not to let it occur again, and informed that if we should find it in the same condition the next time we visited the factory, a sample would be taken and carried to Utica for analysis. This was the nearest chemist we then had, and because of the great distance to be carried, its liability of spoiling and the large expense, I instructed the agents to follow this course. In July, you employed W. Shanly Daly, M. D., of Ogdensburg, as chemist for this section; since which time the following cases have been found below our standard by analysis, viz.: Robert Akin, Rensselaer Falls; William Smith, Hugerton; Charles O'Donald, Lawrenceville; E. Rockwell, Lawrenceville; Ezra Cary, Colton; W. D. Taylor, Boynton.

Cases in my division have been disposed of as follows, viz:

LABEL No. 2238.

THE PEOPLE v. JOHN CORR.

Justice A. N. Haynes' Court, Westernville.

Warrant issued August 26, 1891. Defendant appeared, pleaded guilty, and was fined twenty-five dollars.

Witnesses: Dr. Theodore Deecke, chemist, W. G. Spence and John McCurran.

LABEL No. 2231.

THE PEOPLE v. JAMES DANE.

Supreme Court at Rome, N. Y., October Term, 1891.

Judgment rendered October fifth, of \$100 and costs.

Witnesses: Dr. Theodore Deecke, chemist, W. G. Spence.

LABEL No. 2240.

THE PEOPLE v. THOMAS MALONE.

Suit begun, but, before going to trial, defendant paid \$100 and costs in settlement.

Witnesses: Dr. Theodore Deecke, chemist, William G. Spence.

LABEL No. 2229.

THE PEOPLE v. WILLIAM BAILY.

Justice Morgan's Court, South Columbia.

Warrant issued October 23, 1891. Defendant appeared, pleaded guilty, and was fined twenty-five dollars.

LABEL No. 2227.

THE PEOPLE v. FRANK RAYHILL.

Supreme Court.

Suit begun September 16, 1891, to be tried in January term of court.

Witnesses: Dr. Theo. Deecke, chemist, W. G. Spence and James Donohoe.

LABEL No. 3339.

THE PEOPLE v. H. W. COOK.

Justice Benjamin A. Capron's Court, Boonville.

Warrant issued August 28, 1891. Defendant appeared, pleaded guilty, and was fined twenty-five dollars.

Witnesses: Dr. Theo. Deecke, chemist, Horace A. Rees and David Karlan.

LABEL No. 3340.

THE PEOPLE v. JOHN FORBES.

Justice Benjamin A. Capron's Court, Boonville.

Warrant issued August 28, 1891. Defendant appeared, pleaded guilty, and was fined twenty-five dollars.

Witnesses: Dr. Theodore Deecke, chemist, H. A. Rees and David Karlan.

LABEL No. 3350.

THE PEOPLE v. CHARLES ALEXANDER.

Justice S. L. Mott's Court, Martinsburgh.

Warrant issued September 26, 1891. Defendant appeared, pleaded guilty, and was fined twenty-five dollars.

Witnesses: Dr. Theodore Deecke, chemist, H. A. Rees and Milton Fasset.

LABEL No. 3342.

THE PEOPLE v. FRANK JOHNSON.

Justice S. L. Mott's Court, Martinsburgh.

Warrant issued September 26, 1891. Defendant appeared, pleaded guilty, and was fined twenty-five dollars.

Witnesses: Dr. Theodore Deecke, chemist, Horace A. Rees and Milton Fasset.

LABEL No. 2214.

THE PEOPLE *v.* CHARLES ROBINSON.

Justice Cook's Court, Antwerp.

Warrant issued August 24, 1891; answered to August 26, 1891. Defendant appeared, pleaded guilty, and was fined twenty-five dollars.

Witnesses: W. Shanly Daly, chemist, Charles S. Kellogg.

LABEL No. 2228.

THE PEOPLE *v.* DELOS W. FREEMAN.

Justice William B. Buell's Court, Stittville.

Warrant issued September 26, 1891. Defendant appeared, pleaded guilty and was fined twenty-five dollars.

Witnesses: Dr. Theodore Deecke, chemist, W. G. Spence.

LABEL No. 2237.

THE PEOPLE *v.* JAMES J. SMITH.

Justice C. C. Potter's Court, Marcy.

Warrant issued October 29, 1891. Defendant appeared, pleaded guilty, and was fined twenty-five dollars.

Witnesses: W. G. Spence, George R. Wright, and chemist, Dr. Theo. Deecke.

Many of the other cases not mentioned above have since been settled, and the remainder are now under consideration by our attorneys.

Below find a tabulated statement of the amount of money paid in this division for fines, viz.:

John Corr	\$25 00
James Dane	187 17
Thomas Malone	128 50
Wm. Bailey	25 00

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H. W. Cook	25 00
John Forbes	25 00
Chas. Alexander	25 00
Frank Johnson	25 00
Chas. Robinson	25 00
Delos W. Freeman.....	25 00
James J. Smith	25 00

Total	<u>\$540 17</u>
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All the experts, chemists and attorneys associated with me in the work of this division have cheerfully and faithfully discharged their several duties and rendered the department, as well as myself, all the assistance possible. I have received many courtesies and much assistance from yourself, for all of which allow me to return my thanks.

Respectfully yours,

J. H. BROWN,

Assistant Dairy Commissioner.

Report of Peter H. Parker.

Hon. J. K. Brown, *New York State Dairy Commissioner* :

Sir.—Herewith I submit to you my first annual report for the sixth division of the Dairy Commission of this State for the year ending September 30, 1891.

The department or division that I have charge of consists of the counties of Onondaga, Cortland, Madison, Chenango, Broome, Tioga and Tompkins.

During the past year the milk shipped to New York and elsewhere has been frequently inspected and samples taken for analysis in order that we might discover whether the milk which was being shipped was up to the standard or not. We have also inspected and taken samples of milk sold by the retail dealers in my territory in order that we could determine the standard of the milk handled by them.

The results from such inspections made by the experts and myself show that in this division, as a rule, the milk shipped to New York and elsewhere, and the milk offered for sale in the cities and villages visited by us, has to a large extent been of good quality and up to the standard.

The following statement shows the number of cans of milk shipped per day in my division, and the railroad over which the same is carried, viz.:

	Cans.
Delaware, Lackawanna and Western, Buffalo division.....	388
Delaware, Lackawanna and Western, Syracuse division..	1,166
Delaware, Lackawanna and Western, Utica division.....	2,028
Delaware, Lackawanna and Western, Ithaca division.....	28
Erie railroad, main line	770
New York, Ontario and Western	1,672
Delaware and Hudson railroad	147
Total number of cans per day	6,199

The following tables give a detailed report of the work performed by each expert in my division while inspecting the butter, milk and vinegar, and also the total work of the year as reported to me by such expert:

Report of Charles Sears, for the year 1890-1891.

Number of days in court	58
Number days inspecting milk	128
Number days inspecting vinegar	46
Number days obtaining evidence	43
Number days on special duty	5
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Total number of days	274
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Number of creameries inspected as to condition.....	96
Number of condenseries inspected as to condition
Number of butter creameries inspected as to condition..	12
Number of cheese factories inspected as to condition....	33
Number of milk peddlers inspected	265
Number of stores inspected	86
Number creamerymen's milk inspected on delivery, boat and railroad depots	106
Number dairymen's milk inspected on delivery, creamer- ies and railroads	160
Number dairymen's milk inspected on delivery, butter creameries	336
Number dairymen's milk inspected on delivery, cheese factories	920
Number cans creamerymen's milk inspected on delivery, boat and railroad	4,760
Number cans dairymen's milk inspected on delivery, creameries and railroad	11,336
Number cans dairymen's milk inspected on delivery, butter creameries	920
Number cans dairymen's milk inspected on delivery, cheese factories	2,218
Number cans peddlers' milk inspected	1,581
Number samples store vinegar inspected.....	466
Number cans store milk inspected	162
Total number cans milk inspected	20,977

Total number samples delivered to chemist:

Vinegar	21
Milk	22
Total number of complaints made.....	26
Total number appearances in cases.....	97
Estimated number miles traveled.....	20,977

Report of O. C. Griffin, for the year 1890-1891.

Number of days in court.....	28
Number of days inspecting milk.....	231
Number of days inspecting vinegar.....	15
Number of days obtaining evidence.....	14
Number of days on special duty.....	27
Total number of days.....	315

Number of creameries inspected as to condition.....	95
Number of butter creameries inspected as to condition..	8
Number cheese factories inspected as to condition.....	2
Number of milk peddlers inspected.....	54
Number stores inspected, vinegar 58, oleomargarine 40..	98
Number of creamerymen's milk inspected, on delivery, boat and railroad depots.....	87
Number dairymen's milk inspected, on delivery, cream- eries and railroads	407
Number dairymen's milk inspected, on delivery, butter creameries	137
Number dairymen's milk inspected, on delivery, cheese factories	52
Number cans creamerymen's milk inspected, on delivery, boat and railroad	3,427
Number cans dairymen's milk inspected, on delivery, creameries and railroads	917
Number cans dairymen's milk inspected, on delivery, butter creameries	309
Number cans dairymen's milk inspected, on delivery, cheese factories	52

Number cans peddlers' milk inspected.....	267
Number samples store, inspected, vinegar 31, oleomargarine 40	71
Total number cans milk inspected.....	3,336
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Total number samples delivered to chemist, milk, 5, vinegar, 2	7
Total number of complaints made.....
Total number of appearances in cases.....	8
Estimated number of miles traveled.....	19,510
Doubtful cans of milk.....	4
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Report of John E. Cady, for year 1890-1891.

Number days in court.....	10
Number days inspecting milk.....	225
Number days obtaining evidence.....	18
Number of days on special duty.....	22
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Total number of days.....	275
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Number creameries inspected as to condition.....	124
Number butter creameries inspected as to condition.....	58
Number cheese factories inspected as to condition.....	66
Number milk peddlers inspected.....	182
Number stores inspected	314
Number creamerymen's milk inspected on delivery, boat and railroads	29
Number dairymen's milk inspected on delivery, creameries and railroads	181
Number dairymen's milk inspected on delivery, butter creameries	379
Number dairymen's milk inspected on delivery, cheese factories	228
Number cans creamerymen's milk inspected on delivery, boat and railroad depot.....	1,658
Number cans dairymen's milk inspected on delivery, creameries and railroads	1,402

Number cans dairymen's milk inspected on delivery, butter creameries	1,160
Number cans dairymen's milk inspected on delivery, cheese factories	1,304
Number cans peddlers' milk inspected.....	968
Number cans store milk inspected.....	128

Total number of milk inspected.....	6,620
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Total number samples delivered to chemist ..	8
Total number of appearances in cases	6
Estimated number of miles traveled	11,950

Report of Charles Sears, expert and agent, for year 1890-1891.

Oleomargarine.

Number of days on special duty	2
Number of days inspecting stores	32

Total number of days	34
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Number of samples delivered to chemist ..	1
Number of samples purchased	188
Number of evenings obtaining samples	28
Number of stores inspected	669
Number of miles traveled ..	2,990
Number of hotels visited ...	33
Number of restaurants visited	23

The following statement represents the prosecutions in my division during the year ending September 30, 1891, and also since my appointment as an assistant, for violations of chapter 183 of the Laws of 1885, and amendments thereof, relating to the sale of adulterated milk, butter and vinegar:

CASE No. 1909.

THE PEOPLE *v.* SAMUEL BLAIR.*Court of Special Sessions, Justice D. L. Fisk.*

Warrant issued November 11, 1890; answered to November 12, 1890; adjourned to December 2, 1890; adjourned again to December 3, 1890. Pleaded not guilty. Acquitted.

Counsel, D. L. Atkins.

Witnesses: C. O. York and O. C. Griffiths, and William Manlius Smith, chemist.

CASE No. 2668.

THE PEOPLE *v.* DANIEL VAN TASSELL.

Warrant issued October 1, 1890; answered to October 2, 1890; adjourned to October 14, 1890. Pleaded guilty. Fined twenty-five dollars.

Witnesses: O. C. Griffiths, C. Sears, and chemist, Harry Snyder.

CASE No. 1903.

THE PEOPLE *v.* NELSON STOWE.

Warrant issued September 30, 1890; answered to October 1, 1890. The defendant demanded that the justice should admit him to bail, and that the case come before the grand jury. This was granted by the justice, and he was indicted by the grand jury at the circuit in November, 1890. Pleaded not guilty. The case was then sent to the Court of Sessions of Broome county, and, after passing three terms of said court, was tried in October, 1891. Defendant was then acquitted on the ground of the ownership of the milk.

Counsel, W. D. Painter, district attorney.

Witnesses: O. C. Griffiths, Peter H. Parker, and chemist, William M. Smith.

CASE No. 1904.

THE PEOPLE v. DAVID O'NEIL.

Justice J. D. Chamberlain's Court Special Sessions.

Warrant issued October 14, 1890; answered to October 15, 1890.
Pleaded guilty. Fined twenty-seven dollars.

Witnesses: O. C. Griffis, P. H. Parker, and chemist, Harry Snyder.

CASE No. 1902.

THE PEOPLE v. EDWARD O'NEIL.

Justice J. D. Chamberlain's Court Special Sessions.

Warrant issued October 1, 1890; answered to October second, and adjourned to October 14, 1890. Pleaded guilty. Fined twenty-seven dollars.

Witnesses: O. C. Griffis, P. H. Parker, and chemist, Harry Snyder.

CASE No. 1901.

THE PEOPLE v. I. C. JORDAN & Co.

Justice D. L. Fisk's Court Special Sessions.

Warrant issued December 2, 1890; answered to the same day.
Pleaded guilty. Fined \$200.

Counsel, D. L. Atkins.

Witnesses: O. C. Griffis, P. H. Parker, and chemist, William M. Smith.

CASE No. 1166.

THE PEOPLE v. PATRICK HAYES.

Justice D. L. Fisk's Court Special Sessions.

Warrant issued November 11, 1890; answered to November 12, 1890. Pleaded guilty and fined twenty-five dollars.

Witnesses: C. Sears, O. C. Griffis, and chemist, William Smith.

CASE No. 1.

THE PEOPLE v. WILLIAM ROUNDS.

Justice J. D. Kelly's Court Special Sessions.

Warrant issued December 6, 1890; returnable the same day.
Pleaded guilty and fined twenty-five dollars.

Witnesses: Frank DeLong, and chemist, R. D. Clark.

CASE No. 2666.

THE PEOPLE v. SYLVANUS HATCH.

Justice Down's Police Court.

Warrant issued March 6, 1891; answered to March tenth and adjourned to the seventeenth. Pleaded guilty and fined twenty-five dollars.

Witnesses: Charles Sears, Peter H. Parker, and chemist, William M. Smith.

CASE No. 1744.

THE PEOPLE v. FREDERICK E. AND CHARLES E. SILER.

Justice Horace Russell's Court of Special Sessions.

Warrant issued August 27, 1891; returnable the same day.
Pleaded guilty and fined twenty-five dollars.

Witnesses: Charles Sears, John E. Cady, and chemist, Harry Snyder.

This was a preservaline case.

CASE No. 1743.

THE PEOPLE v. ISRAEL V. KETCHAM.

The above case was carefully investigated, and we found that he was shipping the milk to himself from his own milk depot, for the purpose of manufacturing pot-cheese. We, therefore, did not deem it necessary or advisable to prosecute.

CASE No. 1162.

THE PEOPLE *v.* THOMPSON M. STEELE.

Justice Mullholland's Police Court.

Warrant issued November 11, 1890; returnable November nineteenth, and adjourned to the twentieth of November, and again to December 17, 1890. Pled guilty and was fined fifty dollars.

Witnesses: Charles Sears, J. E. Cady, and Chemist, William M. Smith.

CASE No. 2693.

THE PEOPLE *v.* HENRY M. JEWITT.

Justice O. B. Glezen's Police Court.

Warrant issued May 13, 1891; returnable the same day. Pled guilty and fined twenty-five dollars.

Witnesses: P. H. Parker, Charles Sears, and chemist, Harry Snyder.

CASE No. 2694.

THE PEOPLE *v.* JAMES M. ANDREWS.

Justice O. B. Glezen's Police Court.

Warrant issued May 13, 1891; returnable the same day. Pled guilty, and fined twenty-five dollars.

Witnesses: P. H. Parker, Charles Sears, and chemist, Harry Snyder.

CASE No. 2696.

THE PEOPLE *v.* T. D. KYLE.

Justice O. B. Glezen's Police Court.

Warrant issued May 13, 1891; returnable the same day. Pled guilty, and fined twenty-five dollars.

Witnesses: P. H. Parker, Charles Sears, and chemist, Harry Snyder.

CASE No. 2707.

THE PEOPLE v. RUDOLPH FISHER.

Justice Walsh's Court Special Sessions.

Warrant issued July 7, 1891; returnable the same day. Pleaded guilty, and fined twenty-five dollars.

Witnesses: Charles Sears, P. H. Parker, and chemist, William M. Smith.

This was a case where they were using coloring matter to prevent detection of skimming.

CASE No. 2706.

THE PEOPLE v. B. W. MINOR.

Justice Walsh's Court Special Sessions.

Warrant issued July 7, 1891; returnable the same day. Pleaded guilty, and fined twenty-five dollars.

Witnesses: Charles Sears, P. H. Parker, and chemist, William M. Smith.

CASE No. 2705.

THE PEOPLE v. WALTER FULLER.

Justice Walsh's Court Special Sessions.

Warrant issued July 7, 1891; returnable the same day. Pleaded guilty and paid fine of twenty-five dollars.

Witnesses: C. Sears, P. H. Parker, and chemist, Wm. M. Smith.

CASE No. 2703.

THE PEOPLE v. B. F. MEAD.

Justice Walsh's Court Special Sessions.

Warrant issued July 7, 1891; returnable the same day. Pleaded guilty. Fined twenty-five dollars.

Witnesses: C. Sears, P. H. Parker, and chemist, Wm. M. Smith.

CASE No. 2702.

THE PEOPLE v. W. H. SEABECK.

Justice Rigger's Court Special Sessions.

Warrant issued October 20, 1891; returnable the same day.
Pleaded guilty. Fined twenty-five dollars.

Witnesses: C. Sears, P. H. Parker, and chemist, Wm. M. Smith.

CASE No. 2701.

THE PEOPLE v. SILER BROTHERS.

Justice Horace Russell's Court Special Sessions.

Warrant issued August 27, 1891; returnable the same day.
Pleaded guilty. Fined twenty-five dollars.

Witnesses: C. Sears, P. H. Parker, and chemist, Wm. M. Smith.

CASE No. 2700.

THE PEOPLE v. KNEELAND & LEMONION.

Justice T. B. Manchester's Court of Special Sessions, Sallsville.

Warrant issued October 1, 1891; returnable the same day.
Pleaded guilty and sentence was suspended.

Witnesses: C. Sears, P. H. Parker, and chemist, Francis E. Englehart.

CASE No. 2671.

THE PEOPLE v. EMERSON BENJAMIN.

Court Special Sessions, Cortland.

Warrant issued October 8, 1891; returnable the fourteenth.
Pleaded guilty. Fined \$100.

Counsel, Jas. Dougherty.

Witnesses: C. Sears, J. E. Cady, and chemist, Harry Snyder.

This party was using salt and sugar in order to prevent the detection of skimming.

CASE No. 2697.

THE PEOPLE v. CHARLES E. PIERSON.

Justice Nash's Court Special Sessions, Norwich.

Warrant issued October 13, 1891; returnable the same day.
Pleaded guilty. Fined \$200.

Witnesses: C. Sears and P. H. Parker.

CASE No. 2675.

THE PEOPLE v. FRANCIS BROWN.

Justice Northrup's Court Special Sessions, Canastota.

Warrant issued October 28, 1891; returnable the same day.
Pleaded guilty. Fined twenty-five dollars.

Witnesses: J. E. Cady, Daniel Ladd, and chemist, F. E. Englehart.

CASE No. 2677.

THE PEOPLE v. N. H. HELLER

Justice Smith's Court Special Sessions, Ithaca.

Warrant issued June 23, 1891; returnable the same day.
Pleaded guilty. Fined twenty-five dollars.

Witnesses: O. C. Griggs, J. E. Cady, and chemist, Harry Snyder.

CASE No. 2681.

THE PEOPLE v. E. LAMB AND W. W. WHITE.

Justice Brown's Court of Special Sessions, Owego.

Warrant issued June 30, 1891; returnable the same day.
Pleaded guilty. Fined twenty-five dollars.

Witnesses: J. E. Cady, O. C. Griggs, and chemist, Harry Snyder.

CASE No.

THE PEOPLE v. T. A. MILLS.

This case was brought before the grand jury of Chenango county in September, 1891, and an indictment found to which said Mills pleaded guilty and was fined seventy-five dollars.

BUTTER.

There was but a single case regarding butter, that being against Charles Gilmore, of Binghamton, N. Y., and a sample taken for analysis, No. 1326, which proved to be all right.

CHEESE.

CASE No. 4.

THE PEOPLE v. WHITE, HOVEY & Co.

Justice Van Horn's Court Special Sessions, Bainbridge.

Warrant issued September 17, 1891; returnable the same day. Pleaded guilty. Fined fifty dollars.

Witnesses: Charles Sears, and chemist, Edward G. Love.

This was a case where they were using foreign fats for the purpose of making a filled cheese.

VINEGAR.

CASES Nos. 2658, 2689, 2690.

These cases were from the J. L. Kimberly, Jr., factory at Buffalo, N. Y., and sold by Mills, Ely & Co., Binghamton, supposing they were selling standard vinegar, and after having a sample analyzed, and finding it would not stand the test, Mills, Ely & Co. called in all they had sold and shipped the same back to the manufacturer, and upon these grounds we decided not to prosecute the cases.

CASE No. 2664.

THE PEOPLE v. EMPIRE GROCERY, SYRACUSE, N. Y.

Justice Mulholland's Police Court.

Warrant issued July 15, 1891; returnable the same day.
Pleaded guilty and sentence was suspended.

Counsel, Daniel Bookstaver, Syracuse.

Witnesses: Charles Sears, J. E. Cady, and chemist, William
M. Smith.

CASES Nos. 2665, 2687.

These two cases are still pending, not yet having been tried or
disposed of.

CASE No. 2670.

THE PEOPLE v. SARAH LICHTENBURG.

Justice Mulholland's Police Court, Syracuse.

Warrant issued July 15, 1891; returnable the same day.
Pleaded guilty and sentence suspended.

Counsel, Daniel Bookstaver, Syracuse.

Witnesses: Charles Sears, J. E. Cady, and chemist, William
M. Smith.

CASE No. 2688.

THE PEOPLE v. OSGOOD V. TRACEY & Co.

This case was left with Daniel Bookstaver, counsel, at Syracuse.
A complaint was made, and before any papers were issued the
defendant appeared and pleaded guilty and paid a fine of thirty-
seven dollars and fifty cents.

Witnesses: C. Sears, P. H. Parker, and chemist, William M.
Smith.

CASE No. 2691.

Warrant issued July 15, 1891; returnable the sixteenth. Gave bail for appearance before the grand jury of Onondaga county, and said jury failed to find any bill against defendant.

Witnesses: Charles Sears, and chemist, William M. Smith.

CASE No. 2692.

THE PEOPLE v. ALFRED WALWORTH.

Warrant issued April 28, 1891; returnable the same day. Pledged guilty. Fined thirty-seven dollars and fifty cents.

Counsel, Daniel Bookstaver, Syracuse.

Witnesses: Charles Sears, and chemist, William M. Smith.

CASE No. 405.

THE PEOPLE v. MARTIN KANE, BALDWINSVILLE.

Warrant issued May twentieth; returnable June 3, 1891. Gave bail for appearance before the grand jury. No indictment found.

Warrant issued by Justice Frederick A. Marvin.

CASE No. 415.

Now pending, and undecided, in Cortland.

CASE No. 1911.

THE PEOPLE v. F. T. GREELEY, ITHACA, N. Y.

Justice Merrill's Police Court, Ithaca.

Warrant issued March 17, 1891; returnable the same day; adjourned to the twenty-fourth. Pledged guilty. Sentence suspended.

Witnesses: O. C. Griffis, J. E. Cady, and chemist, Harry Snyder.

CASE No. 2676.

THE PEOPLE v. J. C. STOWELL & SON, ITHACA.

Justice Merrill's Police Court, Ithaca.

Warrant issued March 17, 1891; returnable the same day; adjourned to the twenty-fourth. Pled guilty. Fined fifty dollars.

Witnesses: O. C. Griffis, J. E. Cady, and chemist, Harry Snyder.

The prosecutions above mentioned, which have been carried on in the courts during the past year, have required a good deal of attention from the entire force in this division, have consumed a good deal of time and have received the careful attention of all concerned.

I am very glad to state that each and every one connected with the cases reported, whether as counsel, chemist or expert, have done their duty fearlessly and zealously, and have rendered me great assistance in accomplishing what has been done in my division and which I have the honor to report.

Respectfully submitted

PETER H. PARKER,

Assistant Dairy Commissioner.

Report of John H. Foley.

HON JOSIAH K. BROWN, *New York State Dairy Commissioner:*

Dear Sir.—I respectfully submit this, my annual report, as assistant commissioner, giving, in a general way, a concensus of the work done in my division of the dairy department during the year ending September 30, 1891.

The counties of Monroe, Ontario, Seneca, Wayne and Yates, comprising the subdivision of the State placed under my general supervision, have received from the officers of the State dairy department, during the year, as much official attention as I could give them with the small force of employes under my control.

In this report I will state briefly the work done in the several counties of my division during the year, in their order as above stated.

County of Monroe.

The large and important city of Rochester, and the several other large towns and villages in this county, have required the services of our officers, the most of the time during the year, in inspecting dairy products and vinegar offered for sale on the markets and in taking, when requisite, samples of such products for analysis, and also in attending to the general business of the department. I am not aware of any special matter that has occurred, of importance, during the year, out of the usual routine of the business of the department.

During the past year several persons residing in my division, have made complaint to me of the poor quality of butter sold in our markets, expressing, in every instance, their belief that oleo-margarine or other spurious imitations of butter had been sold them. On learning of them, severally, at what places they had purchased the butter complained of, I caused samples of such butter to be taken for analysis, of which samples so taken four or five were delivered to Professor Lattimore, who made a careful

analysis of those samples and reported to me that upon such analysis he found them all to be butter; that no foreign matter had been added in either case.

The several persons making these complaints insisted upon having the samples analyzed and we could not satisfy them otherwise, although our experts tried to convince them that the samples were pure butter but of very poor quality. We have not been able to detect any oleomargarine or butterine or other kind of spurious butter offered for sale, or in the possession of any person in this division during the year, although every effort has been put forth to discover the same. I am fully satisfied that the trade in such contraband goods has been effectually stamped out in this section of the State.

The business of making butter and cheese in this county for the general markets is, comparatively speaking, quite light, there being but one creamery or butter factory and but one public cheese factory in operation this year. The creamery or butter factory in operation is known as the Jersey creamery, at Scottsville, in the town of Wheatland. This factory was established by Isaac Budlong, Esq., about a year and a half ago. Budlong has owned and operated the same continuously since so established. This factory is managed with great care, under the immediate supervision of the proprietor. The cream supplied to this factory, to be made into butter, is produced from the milk of nearly 200 very excellent cows; over twenty-five per cent of them are pure Jerseys; about fifty per cent are high grade Jerseys and the balance of them are shorthorns and grades. The factory produces about one hundred (100) pounds of excellent butter daily and is kept in continuous operation throughout the year. The product of this creamery is nearly all sold in the city of Rochester; a small portion, however, is sold to the immediate home trade.

Our experts visited the farms, barns and stables where the cows that furnish the milk for this creamery are kept, and in every instance found them in perfect order, the cows well fed, carefully cared for and in excellent condition.

The creamery formerly operated and known as the Genesee Valley creamery, at Wheatland, in this county, mentioned and

described in former reports of your department, has been abandoned and has not been in operation for nearly two years last past; the machinery, tools and appliances having been sold and removed.

The only cheese factory operated in this county is known as the Mendon cheese factory, situate in the town of Mendon. This factory manufactures full-cream cheese for home trade; nearly all thereof is sold in the city of Rochester; a small portion, however, is sold each year to the home trade at the factory. The State brand is not used at this factory, for the reason, as stated by the officers of said factory, that they do not deem it necessary to use the State brand for their trade, as their customers have long been taking their cheese and know the quality thereof.

This factory produces about 350 pounds of very good cheese, on an average, each day of the cheese season, which is usually of six months duration in each year. This factory is apparently well managed and is kept clean and in good sanitary condition.

Our experts, in visiting and inspecting this cheese factory, were informed by the cheese-maker in charge that no complaint could be made of the patrons, as the milk they supplied to be manufactured into cheese was uniformly of good quality, clean and sweet, but should it be otherwise at any future time he would inform us thereof. While visiting this cheese factory our officers gave the cheese-maker our address and informed him that upon complaint made to us at any time of any irregularity or suspicion that any patron was tampering with his milk, we would give the matter immediate attention and would cause the offender, if detected, to be properly punished according to law.

In regard to the milk supplied to our citizens for family use, as food, I am much pleased to report that in the city of Rochester very few complaints have been made this year. Samples were taken by our experts of three milk peddlers complained of; these several samples were delivered to Professor Lattimore, chemist at the university, for the purpose of being analyzed, and the certificates of analyses made by him, in these cases, showed that but one of them was adulterated.

During the year our experts, when in the city of Rochester, have been continually on the alert, watching the numerous peddlers and dealers in milk and vinegar, making frequent inspections of the milk and vinegar offered or kept for sale, and when any cause arose which excited their suspicion, a sample of the suspected article was taken for analysis. The whole number of samples of milk taken in the city of Rochester during the year, and delivered to Professor Lattimore to be analyzed, was fifty-three (53), of which eleven (11) proved to be adulterated. The disposition made of the several parties whose milk proved to be adulterated will be stated later on in this report.

When the fact is taken into consideration that many thousands of cans of milk have been inspected by us in the city of Rochester during the year past, samples taken for analysis whenever the slightest suspicion arose upon inspection, or when complaints have been made, and that only eleven (11) of those samples proved, upon analysis, to be adulterated, several of them showing but slight adulteration, I think you will agree with me in the conclusion that the milk supplied to the citizens of the city of Rochester is, as a rule, excellent.

I have not been able to give as much attention to the towns and villages of this county as I desired, yet, our experts have visited the more important ones and made inquiry of the citizens of those places as to the quality of the milk supplied them for use. Upon such inquiry it was learned, that the consumers of milk in those towns and villages were satisfied with the quality of the milk furnished them and had no cause for complaint, hence I have assumed that the persons dealing in milk in the country towns and villages of this county are, and have been, dealing with their customers honestly and furnishing them with pure and wholesome milk.

Inspection of Vinegar.

I have personally given considerable attention to the inspection of vinegar. There are several vinegar factories in the county of Monroe. One of the largest vinegar factories in this State is located in the city of Rochester, and there are several others of less capacity. A large amount of vinegar is annually manufac-

tured by them. The two experts of the dairy department employed under me have been able to give, and have given, a great deal of attention to vinegar matters. Their inspections of milk are usually made early in the morning and finished, as a rule, before mid-day, hence they have time to attend to the office work and other matters requiring attention, and yet give considerable time to the inspection of vinegar factories and vinegar. During the year we have visited, several times, every cider vinegar factory in this county. Upon these visitations we have carefully inspected and tested the quality of the vinegar manufactured by them, severally, and while we found nearly all these factories making and selling a standard quality, we found others making and selling vinegar which was not quite up to the standard fixed by the State laws, although the vinegar found to be below the standard was made from pure cider stock, but a little weak in acidity. The manufacturers of this vinegar, when notified of the fact, promised to correct the same at once. Soon after our first visitation of these factories we visited them again and found all of them producing standard goods. Since our several inspections of these factories the second time, they have, without exception, made good, pure cider vinegar of standard quality.

Our experts have called several times during the year upon nearly all the wholesale and retail dealers in vinegar at their several places of business throughout the city of Rochester, and have called at least once upon many of the country dealers and inspected their vinegar on sale at their various stores. While so doing they found that nearly all of them kept goods that did not meet the requirements of our vinegar laws. Among the wholesale dealers we found large stocks of malt and grape vinegar made in imitation of cider vinegar. At the retail stores nearly all of them were selling cider vinegar, which was claimed to have been obtained from the farmers of the surrounding county, which in nearly every instance was weak in solids and acidity; the retailers generally claiming to have bought the vinegar of the farmers two or three years since, hence not subject to our jurisdiction. Some of them also kept for sale malt and grape vinegar, and a few, comparatively speaking, were selling a good article of pure cider vinegar of standard quality.

Our experts called the attention of the vinegar dealers, visited by them, to the provisions of the vinegar law, at the same time admonishing them severely, of the necessity of their keeping for sale standard goods so as to avoid the fines and penalties which would thereafter be inflicted for violations of the statutes. We hope and believe that the notice and warning given will result favorably.

Mr. A. S. Delano and Mr. Hoffman Ruger, vinegar experts, residing in Orleans county, have called upon us several times during the year and have rendered valuable aid in our investigations.

In regard to the disposition made of the several parties whose milk proved to be adulterated, as previously stated in this report, I prosecuted four of them in the police court of the city of Rochester; two of them were convicted of misdemeanor and were fined, respectively, twenty-five and twenty dollars. The fines were paid to the police justice. The others were discharged, one of them for the reason that the milk sold by him belonged to his brother, who was one of the parties convicted and fined as above stated; the other defendant was discharged for the reason that he had been previously prosecuted by the city milk inspector and fined, the milk upon which he was prosecuted by the city officer having been taken immediately after our experts had taken the sample upon which I brought the action. I deemed it advisable under all the mitigating circumstances and conditions surrounding these cases, to consent to their disposal as stated.

The remaining seven cases, not prosecuted, remain in abeyance. The parties against whom these several cases have accrued, having called upon me and offered many excuses and extenuating circumstances, upon inquiry and consultation with our experts I thought it might be advisable to let them rest. I think the ends of justice and the enforcement of the dairy laws were best served by cautioning these several persons in regard to their observing the laws in every respect, which they promised most faithfully to do.

The work of visiting and examining the cows furnishing milk for consumption by our citizens, their food and housing, their

sanitary condition and the condition in which the cow-barns and stables are kept, has been faithfully performed, and I am pleased to say that in nearly every instance they were found to be satisfactory. In a few instances where our experts found the condition of affairs in any respect unsatisfactory they gave directions to the parties to see to it and have improvements made at once, which I am informed was done.

The wholesale dealers in vinegar at Rochester frequently, when offered new supplies, send for us to examine and inspect the same, for them before purchasing.

County of Ontario.

In this county three creameries and one cheese factory are in successful operation. Formerly there was a creamery at Victor, Ontario county, known as the Victor creamery, but it has been closed and discontinued.

One of these creameries, known as the Stanley creamery, at Stanley, in the town of Seneca, now in operation, has 141 patrons, makes butter from cream produced from the milk of about 500 cows; will produce this season from 80,000 to 100,000 pounds of butter, is now kept in operation throughout the year and its business is gradually increasing. This factory is kept in good sanitary condition and apparently is well managed.

Another one of these creameries, known as the Sanitarium creamery, on the Foster farm in the town of Manchester, is in successful operation, has thirteen patrons, makes butter from a portion of the cream produced from the milk of about 200 cows, is kept in operation throughout the year; will produce this year about 30,000 pounds of butter; is in good sanitary condition and apparently well managed. The product of this creamery is mostly used at the sanitarium at Clifton Springs; any surplus of butter made at this creamery, over and above the amount required for use at the sanitarium, is sold at Rochester, Oswego, and to the home trade.

The third and last of these creameries, known as the Crystal Springs creamery, situate at Port Gibson, Ontario county, is kept in operation during the entire year. This factory is the most

important creamery in Ontario county, having more than 100 patrons, furnishing cream from the milk of more than 800 cows, and, although the latter part of the year was very dry and pastures poor in consequence of the dry weather, will produce over 100,000 pounds of choice creamery butter. This factory is kept sweet, clean and in good condition, apparently managed carefully and successfully. The butter made at this factory is mostly sold in the cities of Buffalo and Rochester.

The only cheese factory in this county is at the village of Naples. This factory is kept in operation six months or more in each year, is known as the Naples cheese factory, has twelve patrons that furnish milk from about 170 cows, and produces about 150 pounds full-cream cheese, upon an average daily. This factory is kept in good order, clean and neat and produces excellent cheese which is all sold to the home trade.

Owing to the immense amount of work required to be done Monroe county, I have not been able to send our experts to visit and inspect the creameries and cheese factory in this county but once. On that occasion the officers at the several creameries and cheese factory above mentioned were informed of our desire to aid them and to render any assistance in our power which they might require upon their notifying us of their wishes.

While our experts were traveling about the county of Ontario, for the purpose of inspecting the butter and cheese factories of that county and also to look after the milk supplied to the citizens of the principal villages, inquiry was made by them of the citizens of those villages as to the quality of their milk supplies. By these inquiries it was learned that no person, as far as known, had complained of the purity and goodness of the milk supplied them. These inquiries having been thoroughly made in nearly all the important places in the county, I have not deemed it necessary to cause any samples of milk to be taken at any place therein.

I was informed by our experts that considerable vinegar was being manufactured in Ontario county, but owing to the fact that so much of the time has been required in other directions, I have not been able to cause extended inspection to be made therein. A few samples were inspected of vinegar manufactured at Canan-

daigua. The samples inspected were made by J. B. Murray & Son, cider and vinegar manufacturers. These samples proved to be pure cider vinegar of standard quality. Our inspectors learned that most of the retail dealers in the country towns of that county obtained their vinegar supplies from the farmers in their vicinity.

County of Seneca.

In Seneca county no butter or cheese factory has been in operation this year.

The factory mentioned and described in former reports and known as the Seneca farm creamery, situated in the town of Seneca Falls, Seneca county, in which butter and cheese was formerly made, discontinued work more than a year ago, and has not, as yet, resumed. The copartners who were formerly running this factory, unfortunately disagreed and failed in their business. One member of the late firm continues to reside upon the Seneca farm and expressed the hope, to our expert who visited the place this year, that he might be able to resume operations at this factory next spring. Our experts spent considerable time during the year in this county, having been there several times, and they accomplished a large amount of work while there.

In the month of June last I received a letter from George L. Flanders, Esq., assistant dairy commissioner at Albany, inclosing a copy of a letter received at your office from Mr. Button, of Seneca Falls, complaining of the quality of milk delivered to him and directing me to send an expert to that place to investigate. In compliance with your directions, I sent our experts to that county to see Mr. Button and learn the cause of his complaint and to do such work as might be necessary. On their arrival at Seneca Falls they called on Mr. Button and learned that one Andrew Kinnetz had been delivering milk to him, which he believed to be adulterated, and requested that samples of his milk should be taken for analysis. The next morning after their arrival at Seneca Falls they inspected and tested the quality of the milk delivered by Andrew Kinnetz (the man complained of by Mr. Button), and they also inspected the milk of all the milk peddlers who were delivering milk to the citizens of Seneca Falls. While

making these inspections of milk, our experts made inquiry of many citizens of the village as to the quality of the milk usually delivered to them, and in every instance the reply was that the milk was good and satisfactory. Upon these inspections no milk was found that was, in any way, suspicious, hence no samples were taken.

The number of peddlers of milk at Seneca Falls is nine and they sell quite a large quantity of milk daily. Button was not satisfied with one inspection and requested our officers to go with him to his house and talk with his wife about the milk. He also requested them to go with him and see some of his patrons who had complained to him of the milk sold them. Our officers complied with his requests. Upon seeing Mrs. Button they learned from her that oftentimes the milk delivered by Kinnetz, at their creamery, varied largely in quantity and quality, and she said she believed that it was often diluted with water and a portion of the cream taken off. Our officers also learned from one of Mr. Button's patrons, who kept a restaurant at Seneca Falls, and sold considerable milk, that he had made complaint several times of the milk delivered to him, and that he had informed Mr. Button that he would stop taking milk from him if he did not furnish him with better milk. The milk sold by Button was obtained from Kinnetz. In order to satisfy Mr. Button it was agreed that another and further inspection of the milk delivered to him by Kinnetz should be made, unless thereafter Kinnetz delivered good pure milk to him; he was to write us if it was necessary to make further inspection.

While at Seneca Falls upon this occasion, after having made inspection of milk as above stated, our experts visited the places of business of the following named merchants, grocers and dealers in vinegar, viz.: C. L. Story, John McKeon, John Reilly, Finuegan & Co., John Cuddeback, Walter & Woodward, Webner Bros., M. Coffee, Carraher Bros., Thomas McGill, F. Favron, S. L. Monroe, James A. Flanagan, Gargan Bros. and Owen W. Smith. Thorough inspection of the vinegar on sale at these various places of business was made by them.

At the wholesale grocery of C. L. Story, they found that he buys cider of farmers and makes the vinegar he sells; has storage tankage for fifty barrels of cider and makes his vinegar by natural process. The article on sale by him was very good standard vinegar. John McKeon had on hand in stock three barrels of pure cider vinegar, made at the Duffy vinegar factory at Rochester, which was of standard quality. John Reilly had about one half barrel cider vinegar on tap, which constituted his entire stock. He bought this of a farmer some three years ago; not quite standard vinegar. Webner Bros. had on hand but two parts of barrels of cider, which they made from cider, bought nearly three years ago, they said. This vinegar, while being very good, fell a little below the standard in acidity. John Cuddeback had but one barrel of vinegar on hand, which he bought of a farmer; could not tell how old it was; it was short in solids although up to the standard in acidity. Walter & Woodward said they dealt only in goods manufactured by standard vinegar manufacturers; had about two barrels of "Duffy's" vinegar, which was of standard quality. M. Coffee buys cider of farmers and makes his vinegar; had on hand about two barrels, which he claimed was three years old. This vinegar was good although not up to standard. Carraher Bros. informed our experts that they make the vinegar they sell; had only about one-fourth of a barrel in stock, which, upon inspection, showed it contained only 1.1 in solids and 2.1 in acidity. Thomas McGill had about five barrels of vinegar in stock, which he bought at Rochester. This vinegar was manufactured by regular vinegar manufacturers and was standard vinegar. F. Favron had less than one barrel, bought of Crouse & Co., of Syracuse, which was a little weak in acidity. S. L. Monroe had less than one barrel on hand, which he purchased of Harrison & Co., vinegar manufacturers at Canastota. This was standard vinegar. J. A. Flanagan had on hand only about one half barrel of malt vinegar. He had no cider vinegar. Inspection showed .4 solids, 4.1 acidity. The barrel containing same was marked "Guaranteed New York test," but no manufacturer's name was on the cask. Flanagan said he bought this vinegar of Hudson Bros., of Syracuse. Gargan Bros. had in stock only about three-

fourths of a barrel of vinegar, which they claimed was manufactured at the Genesee Fruit Company's factory at Rochester. This vinegar showed upon inspection 1.2 solids and 3.4 acidity; the cask was marked "Duffy's Cider Co., pure cider vinegar." Upon questioning the parties it was learned that they had mixed old cider with this vinegar. Owen W. Smith: This grocer had in stock about one-half barrel of vinegar, which he was retailing, which he bought of a farmer. Inspection of it showed .8 solids and 3.3 acidity. Smith had also on hand one full barrel of stuff called vinegar, which he bought, as he said, of one Jacob Kalny, of Bearytown, Seneca county. Upon inspection it showed no solids and only 2.5 acidity. Our experts advised Smith to return this stuff to the vendor at once, which he promised to do. I have thus stated in detail the inspections made by our experts at Seneca Falls, for the reason that they fairly show the nature of their inspections of vinegar and the quality thereof where they have made inspections, and to avoid further detailed statements of such investigations and inspections.

The manufacturers and dealers in vinegar throughout the several counties of my charge, have been informed by us that they must see to it that they severally keep and sell standard goods.

Our experts find that nearly all the barrels and casks, containing vinegar on sale in the county towns and villages, are not branded in any manner. They called the attention of the dealers to the requirements of the law in this respect and admonished them that they must comply with all the requirements of the vinegar law. Our experts have been to Seneca Falls several times this year, since making their first visit to that place, and on each occasion have called upon the dealers in vinegar and found that where any of them had purchased stocks since the first inspection they had bought standard goods.

Some little time after the first inspections of milk were made at Seneca Falls, as stated above, we received letters from Mr. Button of that place, complaining that Kinnetz was continuing to deliver adulterated milk, and requesting further investigation and samples taken. Our experts were again detailed for that purpose, and upon further inspection took two samples from the

milk wagon of Andrew Kinnetz, one of which proved, upon analysis, to be adulterated.

I have not commenced prosecution of this offender, but have notified him of the fact that his milk was proven to be adulterated and that he was liable for the penalties incurred, and have given the case into the hands of the attorneys to prosecute.

Thorough investigation of the milk and vinegar sold at Waterloo, in Seneca county, was also made by our officers, who found four persons and several firms supplying the milk, and while the milk supplied by these four milk peddlers to the citizens of that village was found to be all right, and the citizens satisfied with the same, the vinegar was found to be about the same character and quality as at Seneca Falls, being mostly obtained from the farmers of the surrounding country. Other villages visited by our experts in that county showed, as regards the milk and vinegar supplies, about the same.

Our experts found thirteen different merchants and grocers dealing in vinegar at Waterloo, most of whom obtained their supplies from farmers of that locality, a large portion of which was weak in acidity. While in Seneca county the principal farms from which milk for sale in the villages was produced were visited and inspected by our officers, and generally found in fine condition; the cows were apparently well fed and cared for, properly housed and kept clean, and were in good condition; the barns and sheds in which the several herds of cows were kept were, as a rule, warm and comfortable, and kept clean and in good sanitary condition.

While passing, it may be well to speak of the efforts I have made since we commenced the inspection of vinegar to ascertain the component parts of the various kinds, other than that made from apple cider, particularly as to the coloring matter used to make them resemble pure cider vinegar. I have caused several samples of malt and grape vinegar to be purchased of dealers, which were delivered to our chemist with instructions to make thorough examination of them and ascertain, if possible, the component parts and kind of coloring matter, but as yet have not met with any success.

Wayne County.

There are in Wayne county two creameries and three cheese factories. These five factories have been in active operation this year.

The largest creamery or butter factory in this county is known as the Sodus creamery. This factory is owned and operated by A. J. Rice, Esq., and is located upon his farm near the village of Sodus. Mr. Rice personally superintends the work done at this factory, and the operation thereof is continuous during the year. The butter made is mostly sold in Rochester. Our experts visited and inspected this creamery but once this season. We have often seen Mr. Rice, the proprietor of this factory, at Rochester, and upon inquiry of him learned that there was no necessity of our assisting him in any official manner; we also learned from Mr. Rice that he had about 100 patrons who furnish cream from about 500 cows; that there was not much change from the situation as reported in former reports made by the dairy department. By referring to your report of 1888, a specific statement of this factory will be found, and the situation, as there detailed, has not been changed in any material matter. Mr. Rice will advise us should he require the assistance of our officers at any time.

Previous to this year there had been but one creamery operated in this county. A new establishment of that kind, however, known as the Williamson creamery, was opened for business this season. This creamery is situated about one and one-half miles from the village of Williamson. Mr. Edwin Baker is the owner and manager of this concern. Mr. Baker was absent from home when we visited the factory, hence we could not get much information. On inspection we observed that the machinery, churn, butter-worker, tempering vat and all the tools and appliances for the successful operation of the factory were apparently new and in good working order.

Our experts visited and inspected the cheese factory known as the Montanas cheese factory, in the town of Butler, in this county. This factory has been in continuous operation throughout the cheese season for many years, and the building has become dilapidated and unfit for business; the machinery and tools used at said factory are worn out and in bad order. Our experts were

informed that this factory would be abandoned and a new factory built during the coming winter, which would be in readiness for the next spring's business. This factory has usually been operated nearly six months in each cheese season, full-cream cheese being made there. About twenty patrons supply the milk from about 125 cows for use at this factory. The average amount of cheese made daily at this factory is 125 pounds. The reputation of the cheese made is good, and it is sold to the home trade.

Our experts visited and inspected the cheese factory known as the Lincoln cheese factory, in the town of Walworth, in this county. The proprietor of this factory informed our expert that he had no complaint to make against any of his patrons, that the milk the patrons delivered to him this season, to be manufactured into cheese, was uniformly of good quality and that he did not require any assistance from the dairy department. Our address was left with him, so that he could write us at any time should he need our assistance. This factory is operated about five months in each year; manufactures full-cream cheese; the average amount of cheese made daily through the cheese season is from 200 to 250 pounds. This factory has fifty patrons who supply the milk from about 300 cows. The full-cream cheese manufactured at this factory has a good reputation and sells readily to the home trade. The State brand is not used at this factory. The buildings, tools and appliances at this factory are good and kept in good order.

The cheese factory known as the Macedon cheese factory, which was formerly operated in the town of Macedon, in this county, and which was fully described in former reports of the dairy department, has been abandoned and has not been in operation for two years last past.

A new cheese factory, known as the Red Creek cheese factory, was built by a stock company about eighteen months ago at Red Creek, in this county. This factory is managed by a president and board of directors. In the month of June last a complaint was made by the president of this factory to the dairy office at Albany, stating that a patron of this factory was delivering adulterated milk and requesting the assistance of the Dairy Commissioner.

Mr. Flanders, Assistant Dairy Commissioner at Albany, wrote to me from your office, inclosing copy of the complaint, etc., and directing me to send an expert to that factory to investigate. In compliance with your direction, I sent our experts to visit and inspect that factory, and to take samples of milk for analysis from such patrons of the factory as the officers thereof suspected of being dishonest in their dealings. Upon investigation and inspection our experts, and at the request of the cheese-maker in charge of said factory, six samples were taken from parties designated by the president and cheese-maker as parties suspected by them of delivering adulterated milk at that factory. Our experts took these six samples of suspected milk in accordance with the requirements of the law and delivered them to Professor Lattimore to be analyzed by him. Soon thereafter the professor reported to me that only one of the samples of milk was adulterated. The sample of milk which proved upon analysis to be adulterated was taken from a patron of the factory other than the one who had caused the officers of that factory to send their complaint to you at Albany, as previously stated. During the time that our officers were at this factory upon that occasion they were informed by the cheese-maker thereof that the officers of the factory had, for some time previously, employed certain persons to go to the farm of the suspected party and secretly watch him milk his cows and prepare the milk to bring to the factory. These watchers reported that they watched as directed and saw the suspected person milk his cows and add water in considerable quantities to the milk in the cans prepared to be taken to the said factory. The cheese-maker also expressed a belief that the fact that such watch had been kept, with the result as above stated, had leaked out and had reached the ears of the suspected person. He gave as a reason for his opinion, that for several days immediately preceding the visit of our officers, the quantity of milk delivered at the factory by this person had materially decreased and, according to his tests, was of better quality.

I am informed that several prosecutions are pending between this suspected party and the officers of that cheese factory, growing out of these transactions.

The Red Creek factory had, during this season, thirty-three patrons, who jointly delivered milk, produced from about 300 cows, to this factory to be made into cheese. Six or seven cheese weighing from sixty-two to seventy pounds each, were made daily, averaging sixty-five pounds each. The cheese made at this factory is a full-cream cheese. Our experts inspected the cheese on hand at this factory, at the time they were there, inspecting and taking samples of suspected milk, as above stated, and found the cheese to be of excellent quality and fit for any market. The cheese made at this factory is sold in the New York market.

Inquiry was made at the village of Red Creek, as to the quality of the milk delivered to the citizens of that place for family use. It was learned that there was no milk peddler to supply milk, but that certain private citizens, who kept cows in or near the village, sold milk to their neighbors when applied to, and that the milk so supplied was of good quality and satisfactory to the consumers thereof.

One of our experts visited the Red Creek cheese factory again, later in the season, and learned from the cheese-maker that they had not had occasion to find fault with any of their patrons since the visitation by our experts as previously stated in this report.

The village of Wolcott, in Wayne county, was visited by one of our experts, who made a thorough inspection of the milk being delivered to the citizens thereof for family use. Upon that occasion he found four persons peddling milk upon the public streets of that village. The milk sold by them, in every case, was found to be good.

Several private persons sell considerable milk in this village to their neighbors. Upon inquiry of many citizens of Wolcott, it was learned by our expert that no complaint, as far as known, had been made of the quality of the milk supplied to the citizens of this village.

The village of Sodus, in this county, was also visited by one of our experts, who made inquiry of several of the business men of that village as to the milk sold to the residents of that town. It

was learned that two milk peddlers furnished most of the milk sold there, although a few private parties furnished milk to their friends. No fault was found by the citizens with the quality of milk supplied them.

Our experts have visited the village of Lyons, the county seat of this county, where they found the milk supplied to the citizens of that place to be very good. Several other smaller villages in the eastern part of this county, were also visited, and, upon inquiry, it was learned that the milk supplied them was good.

I have given considerable attention to the milk business at the village of Newark, Wayne county. Early in August last, I noticed in a Rochester newspaper, that a piece of particularly fiendish maliciousness had been perpetrated at that town. The article stated that C. W. Stuart's milkmen, late on Saturday night, the first day of August, were heard frantically driving about the town, ringing their bells and shouting to their customers not to use the milk they had last delivered to them, but a short time before, as the entire herd of forty-five Holstein cows owned by Mr. Stuart had been poisoned with Paris green; that two of them were already dead, with others in the throes of death. Great consternation at once prevailed among those who had partaken heartily of the milk and they used every means in their power to counteract the effect of the poison. "It was reported that one Daniel Reulhan had died from the effects of the poisoned milk, but this was contradicted and no one is seriously sick." I deemed it advisable to investigate this matter and sent our experts immediately to Newark to ascertain, if possible, the causes which led to this fiendish villainy. Our experts called upon Mr. Stuart and learned from him that some person or persons had placed in the lot, near where the cows went to drink, several heaps of bran and cornmeal mixed with Paris green, which was placed alongside the path the cows followed down to the watering-place and that the mixture had nearly all been eaten up. One heap had not been touched and, judging from the quantity of poison in that heap, there must have been at least seven pounds of Paris green mixed with the meal and bran. Our officers visited the dairy farm where Mr. Stuart kept his cows

and found that twenty-three of them had died and most of the others were very sick and likely to die at any moment. The herd was quarantined, and Mr. Stuart procured milk from several farmers residing near his stock farm to supply his customers. Mr. Stuart sells a large quantity of milk at Newark, although there are five other dealers in milk who severally peddle the same upon the streets of that village. Inspection of the milk sold at Newark has been made by our experts several times since the first of August last, and upon each inspection the milk of each and every peddler was found to be good.

The perpetrators of the outrage at the Stuart farm have not been detected, although many suspected persons were arrested and examined before a justice of the peace of that town, but they were discharged as sufficient evidence could not be obtained to justify the court in holding them for trial for that offense.

A great deal of competition has existed in the milk business at Newark since Mr. Stuart commenced to supply milk to the citizens. Previous to his going into the business, which was about a year ago, milk was sold in that town for five cents a quart. Since he has been selling milk he has reduced the price to four cents per quart, which has engendered much bitter feeling, as we learned from some of the other milk dealers. The parties arrested on suspicion for this crime were milk dealers who peddled milk, in the village of Newark. Our experts have also inspected the several farms, barns and sheds of the dealers in milk, in which the dairy cows are kept that supply milk to the citizens of Newark, and they found the several places in good condition, the cows well fed and properly housed and cared for and generally in good condition.

Many inquiries were made of the leading citizens of that village as to the quality of the milk usually sold, and in every instance they said it was good.

The vinegar kept for sale in Newark was also inspected by our experts. They found that nearly all the merchants of that town were dealers in vinegar, a few of whom were selling standard cider vinegar; the greater majority, however, were dealing in very poor goods.

Our experts visited several other towns and villages in Wayne county and inspected their vinegar supplies, which were found to be, generally, of very poor quality. Notice was given each dealer that he would be required to keep and sell only pure, standard cider vinegar as soon as the stock on hand were disposed of.

Quite an extensive factory for the manufacture of cider and vinegar has been erected at Newark by a concern known as the Duffy, Montford & Greene Cider Co., Walter S. Montford being the general manager. This concern commences manufacturing this fall and intends to make nothing but standard goods. The parties were formerly connected with the Duffy Cider Co., of Rochester, and are experienced men in the business.

Yates County.

Our experts have visited Yates county three times this year. No butter or cheese factories were in operation this year in this county. The two cheese factories which were in operation in 1888, mentioned and described in the annual report of that year, have been closed and abandoned. We learned that efforts were being made to erect a new factory, to be completed and in readiness for business next spring. The parties interested in this undertaking expressed themselves as very confident of success, and that the new factory would be built during the coming winter.

Our expert saw Mr. Seidel, who owned and, until this year, operated one of the old factories above mentioned. He informed us that want of sufficient patronage caused him to discontinue operations at his factory. Our experts inspected the milk and vinegar offered for sale at the village of Penn Yan three times this year. On making inquiries they found that most of the milk supplied to the citizens of Penn Yan was furnished by three parties, who peddled their milk upon the public streets and delivered the same at public and private houses. A few private citizens also furnished milk to their neighbors and friends.

Mr. Oliver J. Sprague, one of the parties furnishing a portion of the milk supplied, buys his milk from farmers residing near the village. He runs three milk wagons and sells about 350 quarts daily, upon an average. Upon two occasions our experts inspected the milk upon his wagons, which was being offered for

sale, and found the same to be good, pure milk. Inquiry was made of several of his customers, as to the quality of the milk he furnished them, and they all said they had no fault to find with it. Mr. Andrew C. Miller, another dealer in milk at Penn Yan, resides on a farm near the village and is a farmer. He sells the milk produced from twenty cows and sells upon an average about 200 quarts daily. He supplies the principal hotels at Penn Yan and sells the remaining portion to the citizens at their residences. The milk sold by him is standard milk. Mr. Joseph Duffy also peddles milk upon the streets of Penn Yan. He buys the milk he sells from a farmer. He but recently went into the business and his sales are, comparatively, small, being but about 100 quarts daily, on an average. We found that he was selling pure standard milk and his customers were well pleased with his service. The milk supplied by private parties, to their neighbors, was not inspected, but was assumed to be all right.

Our officers visited the farm of Andrew C. Miller to see his cows and inspect the manner in which they were kept. The herd was found to be in good condition, well housed, properly fed and cared for. The cow stables were clean, warm and comfortable and the animals appeared to be in good sanitary condition.

On making inspections of the vinegar kept for sale at Penn Yan, our experts found that nearly all the persons and firms, engaged in trade at that place, kept and sold vinegar. They also found a person operating a factory near Penn Yan, manufacturing apple-jack, who also manufactured vinegar. Fifteen different persons and firms were found selling vinegar in Penn Yan, five of whom were selling pure cider vinegar of standard quality. The other ten were selling vinegar purchased from farmers which was weak in acidity and deficient in solids. At the apple-jack factory our experts found about 150 barrels of cider vinegar some of which was standard while a large proportion was weak in acidity. The manufacturer claimed to have bought the cider from which the vinegar was made three or four years ago. The attention of the dealers in vinegar at Penn Yan was called to the requirements of the vinegar law, and they were severally instructed that they must comply with all its requirements.

The village of Dundee, in this county, was also visited by our inspectors. Inspections were made of the milk and vinegar supply at that place. The milk consumed by the citizens of Dundee is furnished mostly by two farmers residing in the vicinity of the town. Mr. C. H. Carpenter produces milk from thirteen cows, which he sells to the inhabitants of Dundee. He sells, upon an average, 100 quarts daily. Upon inspection of the milk sold by him, it was found to be of good quality. His barns and cow stables are kept in good order and clean; his cows are well fed and cared for, appearing to be healthy and in good condition. Upon inquiry of several persons at Dundee, who buy his milk for use in their families, we learned that it had always been good and satisfactory to them.

Mr. George Havens, a farmer residing about a mile from the village of Dundee, also supplies milk to the citizens of that village. The milk supplied is the product of thirteen cows, and his daily sales average 100 quarts. We found, upon inspection of his cows, barns and stables, that he produced and sold good milk, kept his cows well and in good warm sheds and stables, and, upon inquiry among his customers, learned that they spoke very favorably of himself and of the milk which he sold them.

Our experts called at the various stores and grocery houses at Dundee and found five places where vinegar was sold. At one of these places pure cider vinegar of standard quality was on sale.

At all the others vinegar obtained from farmers was kept which was weak in acidity and, in most cases, deficient in solids. Our experts explained the requirements of the vinegar law to the various dealers and advised them to respect the same and avoid possible trouble or liability.

The village of Dresden and several other small villages of that county were visited by our experts, who found about the same condition of affairs existing in them severally, as to their milk and vinegar supplies, hence I will not enter into details further in this regard.

In May last Mr. Marcus A. Perry, who was formerly in charge of the Buffalo division of the dairy department, as assistant commissioner, now employed as dairy agent at Rochester, informed

me that a suit was pending in the Supreme Court at Buffalo, in the name of the People against one Jacob Dold for a penalty for manufacturing and selling oleomargarine and butterine in that city. This suit, he informed me, had been commenced by him several years ago and had been continued, from time to time, by the defendant, but had been put on the calendar for trial at the present May term of the Supreme Court at Buffalo. Mr. Perry and Professor Lattimore, our chemist at Rochester, were the material witnesses in the case on behalf of the people. Mr. Perry requested me to so arrange the business of the department at Rochester, that he and Professor Lattimore might be permitted to attend the court at Buffalo without interfering with the department's business at Rochester, which I did. Mr. Perry and Professor Lattimore were in attendance at that trial several days as witnesses for the people upon the trial of the case, which resulted in obtaining a judgment against the defendant for \$500 and the costs of the action. I presume that you have heretofore been fully advised as to the result of this suit.

I am pleased to report that the dairy interests in my division are in a satisfactory condition and but few complaints are made to us from any quarter.

In closing, I am gratified to report that I have had during the year, able and efficient assistance, rendered by the subordinate officers of the department under my supervision, who, I believe, have performed their duties faithfully and to the satisfaction of the people.

Thanking you for courtesies extended, I respectfully submit this report.

JOHN H. FOLEY,
Assistant Dairy Commissioner.

Report of George J. Zillig.

BUFFALO, N. Y., *October 1, 1891.*

HON. JOSIAH K. BROWN, *New York State Dairy Commissioner:*

Upon receipt of my appointment as assistant dairy commissioner for the district comprising the counties of Erie, Niagara and Orleans, to succeed Peter Drexelius, Esq., resigned, I immediately assumed the duties of the office and continued the work of the department, without interruption or friction, with the assistance of the long experienced experts connected with the office, who continue to give the benefit of that experience to the State by continued service under my administration.

In submitting this annual report I recognize the fact that it is the report of an official, and not of an individual, and therefore combine the transactions of my predecessor's administration and my own in one continuous report.

The work of this department annually increases, and from the enactment of the vinegar law, additional force has been required and urged, until absolute necessity required the appointment of one more expert in the person of Mr. Frank E. Giese, whose business training has acquainted him with the products with which this department has to deal, and the methods of their adulteration, thus fitting him for the work, and making a valuable addition to the expert force of this office.

After satisfying myself as to the past workings of this department, I concluded that attorneys of ability, force and promptness were required for the conviction of offenders, and to impress the fact upon the people, that indictment, conviction and penalties would promptly follow the discovery of violations of the law, I, therefore, have selected Armstrong and Witcher to act as attorneys for this division, where the services of such may be necessary. Their reputation and standing in the community is a guarantee that the interests of the State will not suffer at their hands.

The old force of experts, Messrs. Michael Galligan, John J. Coughlin and Samuel Abrams, having mastered every detail of the work outlined by the law, have attained a proficiency only acquired by long service.

Inspections of Milk.

The results of repeated investigations the past year show that the objects of the dairy laws are more nearly realized than ever before. The convictions of a number since the law went into effect have proved a salutary lesson to the many.

Milk dealers and milk shippers are more careful that their product reaches the legal standard, and imitation butter is an article almost unknown. But we are convinced that this is so only because of the vigilance of the dairy officials, and that a laxity in that respect, or a withdrawal of the protection of the consumers by the State, would cause a return to former conditions by the unscrupulous, whose competition would compel the more honorable to resort to adulteration if they would maintain their places in trade.

The time may come when conditions will minimize the possibilities of adulteration. When producing stock has reached a higher standard — when through the breed, feed or care, a maximum quantity of the best possible quality is reached in the output of the animal — then adulteration will not be necessary to bring satisfactory returns for the product; or, when long accustomed to pure milk, the consumer can detect and reject the impure article, then, by force of circumstances, will the dealer offer only pure milk, and the vigilance of this department may, to an extent, be withdrawn.

But that time is far in the future, and the expert must continue his daily rounds to insure the enforcement of the law and the protection of the ever increasing mass of consumers.

In proof of the efficacy of the inspections, and tests of the experts, reference is made to the fact that the large number of samples taken have resulted in few arraignments, which proves that the dealer is in continual expectation of a visit from the expert, and will not risk possible detection by selling impure milk. Another evidence that such dealers do not expect that this

department will discontinue, even for a day, its inspections, is shown by the number who bring samples to this office at regular periods for inspection, thus anticipating the inspections of our experts and showing their desire to conform strictly to the law.

The law is working satisfactorily to both dealer and consumer, and its good effects are recognized in a statement of the local health office to the effect that "no impure milk was being sold within the city limits."

It is not our desire to be understood, however, that all dealers are inclined to dishonesty or require watching. There are those who sell only high grade milk at an increased price, and could not and would not sell any other quality.

The greater vigilance is required in the case of those who, starting in business, require increased profits to make up for limited trade, or who, unable to judge of the quality of milk they purchase of others, are imposed upon by consignors.

Milk of City Fed Cows.

The large number of cows kept in barns in the city of Buffalo have been the cause of much comment, and some local papers have declared that the milk produced by such was necessarily impure. There is no question but that a few years ago this charge was just, but the continued and aggressive action of this department and the city health department has changed the condition of these places. The rickety, foul shed, in the heart of a thickly-settled block, has given place to a modern structure, planned on sanitary principles, and, as a rule, erected in the outskirts of the city.

The agitation against the cow-barns to-day comes from neighbors who are annoyed by the near proximity of these barns, and not because of impure milk.

The greater number of these people are poor, and find their livelihood in this business, and we have always endeavored to influence these people to comply with the law, and avoid the charge of prosecuting them. The city has been compelled to take cognizance of all complaints made, and have relieved this department of the necessity of prosecuting where otherwise we would have considered it incumbent on us to have brought prose-

cution against some persons whose product failed to reach the required standard. So long as the object aimed for is attained, and we are satisfied with the result, no action on our part is required.

Milk Peddlers.

As will be seen in the subjoined tabulated statement, our experts have been alert and active. At daybreak of each week day, they have intercepted dealers entering the city and sampled their milk which was about to be delivered to city customers.

These samples were immediately subjected to the lactometer and cream-gauge tests, and where found below the standard, have been submitted to our chemist for analysis. The character of the stock producing the milk and the conditions of the weather, are the undoubted factors causing the variableness of the density of the solid ingredients in milk. Some reach far above the standard and others will be but slightly above requirements. Others will gauge far above the standard as to some ingredients, while other components in the same milk will be below the standard. It requires some discriminating judgment as to prosecuting in such cases. First, that we may not unjustly prosecute, and, secondly, because invariably judgment has been against this department where it has not the strongest evidence of adulteration. These inspections of milk on the wagons of peddlers has the effect to keep these dealers on their guard, and the frequency of the visits of our inspectors, compel them to handle only pure milk for fear of detection.

Many of these dealers purchase their milk of farmers and rely on the honesty of such to supply the unadulterated article. A number of such dealers, at intervals, bring samples of milk consigned to them for our inspection. Considering this fact, we have, in cases where the milk has been found adulterated, sent our expert to the point of shipment to thereby secure evidence that would bring the guilty consignor to justice.

Milk Received by Rail.

The amount of milk brought to Buffalo by rail is annually increasing. The following table shows the amount for the past year:

EIGHTH ANNUAL REPORT OF THE

Number of gallons of milk received from October 1, 1890, to September 30, 1891.

[illegible]

The farmers consigning milk generally make this their sole business and the farm is made to yield crops that will produce the best results as feed for cows. Improved breeds of cattle are sought by these milk farmers, and every means are used to produce the best quality of milk to enable them to secure the best customers and better prices.

With the best cows, pure and fresh feed, good housing and fine pastures, such milk should be and is generally of a high quality, and with which the product of city swill-fed cows has no comparison.

Yet, occasionally, adulterated milk is found among large consignments. The fact that it is rarely found among consignments to large hotels, and always in that shipped to milk dealers, is evidence that the adulteration is willful either on the part of the consignor or consignee.

Our experts have, at short intervals, stationed themselves at the depots, on the arrival of the morning and evening trains, and taken samples from the cans, with the name and residence of the consignors, and when found impure, samples are obtained at place of shipment.

Not so many violations as heretofore have been found. The great demand from large city hotels and restaurants, who pay an enhanced price, encourages farmers to produce the best results that they may secure this desirable patronage, and the wholesome punishment of some of the slovenly, indifferent class has deterred them from adulterations, fearing detection and punishment.

Milk at Cheese Factories.

Cheese-making is a large industry in this district, especially in the interior towns, and the larger part of the milk production is delivered to these factories. Here the unscrupulous producer will run the risk of detection and adulterate his milk.

We have sampled milk at these factories, as it is delivered, on frequent occasions. We find less poor results from inferior cattle than usual, as stock is being continually improved. Farmers are convinced that high grade cows are most profitable, giving greater

quantity and better quality of milk. Occasionally milk is found that will not reach the standard of solids, but which, evidently, had not been tampered with, while in a few cases adulteration was evident. This branch of the work needs greater vigilance than the force engaged in this division permits. This division covers a territory fifty miles in one direction by fifteen miles in the other direction. Much of this territory must be traveled over in vehicles, and even by rail, only small sections can be reached by any one railroad. The visits to any section can only be at long intervals, giving opportunity, in the interim, for undetected violations of the law. We are pleased to report, however, that there are few complaints, comparatively, from managers or patrons of factories. While some such are careless and indifferent, many, however, are more vigilant, and believe that their own protection requires them to report every patron against whom they have the least suspicion. Many of the suspicions prove unfounded, upon examination, while others have warranted our attention, and the experts of this office have promptly proceeded to the factory and taken samples of milk, and, when required, submitted it for analysis. I am satisfied that this division has been vigilant and active in the discharge of duty in this branch of the work, and has been greatly aided by the managers and foremen of the factories in the district, who appreciate the good work of the department and its influence to deter the delivery of impure and adulterated milk, which, if used, would depreciate the quality of their cheese product.

Vinegar Inspections.

The limited means provided for the enforcement of the vinegar law, which devolves upon the dairy department, makes it impossible that our methods of procedure should be as thorough as we could wish or the intent of the law demands. We have endeavored to give some attention to this branch of our work, however, and are ever on the lookout for bogus vinegar, while performing our other duties in the dairy department. The exhaustive report on the quality of the vinegar sold in this district, made by expert Delano, is fully justified by experience and investigation, for we

find little poor vinegar on the market. Yet we are not justified in saying that all vinegar used in this division is pure cider vinegar of the required standard. There are too many who deal vinegar out to customers to make it possible for our experts to visit all of them. Were we certain that they all procured their stock from local makers it would give us little concern, for we are satisfied that the large manufacturers have aimed to comply with the law. As spirit vinegar can be procured at a much reduced price from that paid for the genuine, small dealers might be induced to carry it if they thought a relaxation of vigilance on the part of this department insured their protection. It seems to me necessary, therefore, that the Legislature provide sufficient means for a thorough investigation and inspection, at least semi-annually. While, under the present conditions, I shall do all in my power, with the aid of the experts, to discover violations of the law and bring offenders to justice, I would not like to be held responsible for the thorough enforcement of the law as it is a physical impossibility with the present force employed.

Complaints and Prosecutions.

The case of Eldred E. Watts, reported in last report, came up for trial October 7, 1890, was postponed until the March term, 1891, and further postponement denied. He was acquitted after jury being out for eighteen hours.

On November thirteen, a complaint was received from a Mr. McCue that imitation butter was being shipped to him as pure butter. Samples were analyzed by Chemist Vandenberg, and complaint shown to be unfounded, no foreign substance appearing.

December 26. On complaint of a milk peddler of the city of Buffalo, six samples of milk being shipped at Machias was taken and proved to be of good quality, and the stables of the shipper were visited and found to be clean and in good condition. The complaint that the milk was impure and of bad odor had no foundation in fact.

January 21, 1891. On complaint of milk dealers in Rochester, samples of milk being shipped to that city from Crittenden, N. Y.,

were tested and found up to the legal standard and the complaint had no foundation in fact.

January 28. The experts of this office visited the city of Jamestown, N. Y., and sampled milk being peddled on the streets, all of which proved upon test to be up to the legal standard.

February 4. On complaint of consignees in Buffalo, the milk being shipped by two consignors at Lancaster, N. Y., was sampled and submitted to Chemist Vandenberg, who pronounced them up to the standard.

March 14. Upon complaint, a warrant was issued against George Bleimeister, of Buffalo, for selling adulterated milk; arraigned March seventeenth; adjourned to March twenty-sixth. Pleaded guilty and fined twenty-five dollars.

March 14. Upon information from Assistant Commissioner Van Valkenburgh, of New York city, that a cargo of filled-cheese had been shipped to Buffalo from Chicago, our experts took samples of same immediately on arrival and submitted them to Chemist Vandenberg, who pronounced it good and unadulterated.

March 20. On complaint, a warrant was issued against W. A. Cook for selling adulterated milk; arraigned March twenty-fourth, and was convicted and fined twenty-five dollars.

March 25. Otto Memberger and Adam Smith, peddlers, of Buffalo, were convicted by Judge King for selling rancid butter, and each fined twenty-five dollars. In this case complaint was made direct to the court and prosecuted by the local officials, and the fines, therefore, belong to the city.

April 14. A similar complaint was made direct to the city authorities against Stanislaus Sepovitch for selling rancid butter, and a similar fine was imposed by and in behalf of the city.

The above three cases were those of persons who had purchased spoiled butter and resold it at an advance. While the cases were taken out of our jurisdiction, we interested ourselves in their conviction and for that reason make a note of the cases here.

May 5. In the case of the People v. Jacob Dold Packing Company, which has been before the court for two years, the people received a verdict of \$500 in the civil action. The defendant was granted a stay of proceedings for sixty days.

May 27. Warrants were issued for Martin Stafell for selling and offering for sale adulterated milk; arraigned before Judge King, May twenty-ninth; adjourned to June third; again adjourned to June fifth. Convicted and fined twenty-five dollars.

June 5. Warrant issued for J. H. Kreinheider for selling and offering for sale adulterated milk; arraigned July seventeenth; adjourned to July twentieth; pleaded guilty and fined twenty-five dollars.

June 5. Warrant issued for Joseph Halter for selling and offering for sale adulterated milk; arraigned July seventeenth; pleaded guilty and fined twenty-five dollars.

June 8. Warrant issued for Philip Dietz for selling and offering for sale adulterated milk; arraigned July seventeenth; pleaded guilty and fined twenty-five dollars.

June 30. On complaint of parties of Lawton's cheese factory, Lawton, N. Y., the experts of this office proceeded to the place and took samples of milk as delivered by the suspected parties, and the same were analyzed by Chemist Vandenberg and pronounced up to the standard.

July 10. On complaint of the patrons of Colden's cheese factory, Colden, N. Y., the experts of this office visited the place and sampled the milk, as delivered, of five suspected parties. All were up to the standard except that of Nicholas Beyer, which chemical analysis proved to be adulterated. Our attorneys proceeded with the prosecution and the case is now pending.

July 17. On complaint of patrons of the cheese factory at Eden Center, our experts took samples of the milk of five suspected parties, all of which proved up to the standard except that of Charles Partridge, which chemical analysis proved adulterated. Our attorneys proceeded with the prosecution and the case is now pending.

August 6. On complaint of patrons of the Biglow cheese factory at Springville, the experts of this office procured samples of five suspected parties, all of which proved to be up to the standard except that of Henry W. Biglow. Our attorneys proceeded to prosecute and Mr. Biglow paid the amount of the penalty, \$100.

August 6. On complaint of patrons of the New Oregon cheese

factory, at New Oregon, N. Y., the experts of this office procured samples of milk being delivered by six suspected parties, and the same were analyzed by chemist Vandenberg and all found good except one, and the party supplying the milk is now being proceeded against.

Vinegar Cases.

December 23, 1891. Complaint was received that two large jobbers in vinegar were receiving and placing on sale large quantities of doubtful vinegar marked "cider vinegar." The experts of this department procured samples of the same, which were analyzed by Chemist Vandenberg and found to be cider vinegar below the standard. Vinegar Inspector Delano visited the firm, and, becoming satisfied that they were innocent of any intentional violation of the law, it was decided not to prosecute if the vinegar was shipped outside of the State of New York, where it had been originally procured.

April 16. Complaint was received that Chaddock, Hickox & Co., jobbers in vinegar, were handling impure vinegar. Our experts took samples which were analyzed by Chemist Vandenberg, showing only three and ninety one-hundredths per cent acetic acid, and that the same was colored with burned sugar. The vinegar was shipped back to Detroit where it had been manufactured.

Fines.

The amount of fines collected for violations of the law, upon conviction, is as follows:

George Bleimeister	\$25
W. A. Cook	25
Martin Stafell	25
J. H. Kreinheider	25
Joseph Halter	25
Philip Deitz	25
Henry W. Biglow	100
	<hr/>
	\$250
	<hr/>

Of which \$125 due the State has been forwarded to the State treasurer, and the balance retained by the court inflicting the fine.

Samples of Food Product.

The number of samples taken by our experts during the past year have been as follows:

John J. Coughlin:

Butter	98
Cheese	114
Milk	1,189

Michael Galligan:

Butter	50
Cheese	32
Milk	1,477

Samuel Abrams:

Butter	102
Cheese	15
Milk	310

Frank E. Giese:

Butter	5
Cheese	13
Milk	179
	<hr/>
	3,584

Conclusion.

I take this opportunity, on behalf of those connected with the department the past year, to acknowledge the promptness and efficiency displayed by Judge Thomas S. King, of the police court, Buffalo, in disposing of the cases tried before him. His honor has always treated this department fairly and justly, and his prompt enforcement of the law on convicted parties has been a great aid in the discouragement of milk adulteration in the city of Buffalo.

We would also recognize the conspicuous ability of our analytical chemist, Dr. F. P. Vandenberg, whose analyses have always

proved reliable and convincing in evidence before a court, and we have been pleased to defer to his judgment in the disposition of cases where the evidence was of doubtful character.

The experts of this office are deserving of your highest consideration for the able manner in which they have performed the work assigned to them.

Gratefully appreciating the honor conferred in selecting me to the charge of this division of the dairy department, I assumed the office with the sole aim for the success of this division in stamping out effectually and permanently all adulteration of food products.

Respectfully yours,

GEORGE J. ZILLIG,

Assistant Dairy Commissioner.

Report of James W. McMahon.

ELLCOTTVILLE, N. Y., *November 15, 1891.*

HON. JOSIAH K. BROWN, *New York State Dairy Commissioner:*

Sir.—I most respectfully submit the following report of the transactions of the dairy department of this division, comprising Cattaraugus, Chautauqua and Allegany counties, during the period embraced since my appointment and assignment to this division July 1, 1891, until November 1, 1891. I found upon being assigned to work in this district that the sentiment of the farmers and sympathy of the factory owners was enlisted in the cause of enforcing the law. I was met with kindness and help by those, who, to my personal knowledge a short time ago, were antagonistic to the enforcement of the law, and I ascribe this change of feeling to the indirect good results that have followed the enforcement of the law, designed to put a stop to the adulteration of milk used in the manufacture of cheese or delivered in cities and villages of this State. This district undoubtedly manufactures more cheese than any other district in the State, embracing as it does Allegany county, with eighty-nine factories and 20,000 cows, Cattaraugus county, 121 factories and 37,500 cows, and Chautauqua, with ninety-five factories and 31,000 cows, and with the limited amount of help at my command and the vast amount of work necessary to perform the inspection of some of the factories has not been as satisfactory as might have been desired. Still I may say that the inspection has been very thorough in the district covered, and especially so in all cases where complaints have been sent us by the cheese-maker or factory owner. In all instances the aid and assistance of the proprietors of the cheese factory has been cheerfully extended to us, and their aid in this respect has made the work accomplished by the experts of more value to the dairy interests than it otherwise could possibly be.

Complaints have been frequent that milk delivered by patrons was of a doubtful quality, but in most instances it stood the lactometer test. The factory owners, with much justice, claim that the standard established by law, as the standard gauge below which good milk will not go, is too low, and that while that standard exists cows will be bred more for the flow of milk than for the quality. The enforcement of the dairy laws in the past has been of incalculable value to the dairy interests of this section of the State, and more interest is taken in this industry to-day than ever before in the history of the State. Better and warmer barns are being provided for the cattle; improved strains of blooded stock is being introduced; the commercial and milk-producing value of different foods is being studied, and the dairy farmers are to-day giving the same amount of intelligent study to this industry as does the successful business man or manufacturer to his interests. The enforcement of the dairy laws has made it possible for the manufacturers of butter and cheese to hold their products and not fear competition from adulterated cheese or butter. This has increased the average price of butter about twenty per cent, and had a correspondingly beneficial effect upon the price of cheese. The number of factories visited by experts under my instructions was as follows, viz.:

By Expert Walsh: Seventy-two factories, samples taken at each; supplied by local dealers, peddlers, etc., to inhabitants in villages, etc.; twenty-six samples taken.

By Expert Corbett: Thirty-four factories visited; twenty-five creameries; samples taken at each factory and creamery.

By Expert Peasley: Fifty-three factories; 151 samples.

By Expert Taylor: Twenty-five factories; samples taken at each.

By Expert Toomey: Peddlers' wagons, Jamestown, Dunkirk and Fredonia; 108 samples.

The prosecution of cases in this district, having been commenced by Assistant Commissioner Sutley or Drexelious, will undoubtedly be included in their report to you. The amount of good done by a visit of the expert to a factory, even when the milk shows all right by the lactometer test, is pretty conclusively shown

by the following letters which I have taken verbatim (excepting the name), from letters submitted to me by Expert Walsh in his report:

MACHIAS, N. Y., *October 5, 1891.*

Mr. J. W. WALSH:

I wish you would try and come to my factory as soon as convenient. Your visit here two months ago has made a great difference in the way milk is being sent in.

Yours respectfully.

HUMPHREY, N. Y., *June 13, 1891.*

Mr. WALSH:

Dear Sir.—I told you I would write you and let you know how things are. Those two patrons I suspected are fetching number one milk. Would be glad to have you come any time.

Truly yours.

OTTO, *August 1, 1891.*

Mr. JAMES W. WALSH:

Dear Sir.—Our people would like to have you come and test milk. I know it is all right but the patrons like to have it tested about so often. My factory is about two miles from the village, next to the one you visited last month.

Yours, etc.

LITTLE VALLEY, N. Y., *July 9, 1891.*

MILK COMMISSIONER, *Ellicottville:*

Dear Sir.—If you happen around this town before long I wish you would drop into the factory. We have had no trouble since you were here. Everything is working to a charm.

Yours truly.

I also beg leave to state that the experts report an improved sanitary condition of the factories, better drainage, cleaner utensils, cans, etc., whey vats further removed from factories, and a general thrifty condition of factories and creameries, and a great deal of interest by the patrons in an improved condition of the factory

and quality of manufactured products. The aid of the proprietors and patrons of the factories, who regard the dairy laws as a valuable protection to them, has materially assisted us, and so long as the course of this department merits their approval, they can be relied upon to aid in the enforcement of the law. I have avoided giving any reason for being charged with persecution, in the discharge of my duties, and at all times have asked the co-operation of the patrons and factory owners in my work. The system of inspection at the different factories and creameries of this district is thorough and the result satisfactory. During the past season Messrs. Morgan and Hall, expert cheese-makers, have passed a month in this district, and their visit has been productive of good results. I would recommend that during the winter months, when farmers can give the time to this branch of the business, that meetings be held under the auspices of the dairy department, at the different points most convenient for farmers, and practical instructions given by expert cheese and butter makers; that the sanitary condition of the barns and surroundings, and the value of different foods as milk, bone and flesh producers be subjects of inquiry at such meetings. Although the activity and vigilance of this department during the past season has resulted in much good, I am confident that the future will show to a greater degree the value of the work in this department and the salutary effect of the enactment of the dairy laws. The friendly co-operation and especial interest in the workings of the dairy laws, shown by the owners and patrons of the factories, cannot but result in much good in the future. I would respectfully recommend that printed directions concerning the care, reception and keeping of milk, the cleanliness of factory buildings and utensils, drainage, etc., be furnished to experts for posting in each factory, and that printed copies of all the more important acts of the Legislature, and orders of the Dairy Commissioner be sent to experts for distribution among managers of factories and patrons thereof. Owing to the fact that my report does not cover a very long period, and that Assistant Commissioners Sutley and Zillig will undoubtedly include in their report all the work done in this district, prior to my assignment to work here July 1, 1891, I will conclude by offer-

ing my grateful acknowledgments to Experts Walsh and Corbett, for their untiring work and great interest as experts in the enforcement of the law, and also to Dr. McDuffie, chemist, and Messrs. Taylor, Toomey and Peasley for the aid they have rendered me in the performance of my duties.

Respectfully submitted,

JAMES W. McMAHON,
Assistant State Dairy Commissioner.

Report of Geo. A. Smith.

Hon. J. K. BROWN, *New York State Dairy Commissioner, Albany, N. Y.*

Sir.—I respectfully submit the following report of the work performed by the experts in the line of dairy instruction for the year ending September 30, 1891. Messrs. Hall and Morgan will give an individual report of the work performed by them during that time.

After the close of the last report I was engaged in the southern part of Oswego county visiting factories and giving instruction in the methods which our experience taught us gave the best results.

October fourteenth, in company with the late Colonel F. D. Curtis, I went to Linwood, Livingston county, where we gave instruction in both butter and cheese making, and also held a public meeting. From there we went to Broome county and held dairy meetings.

These were all held by special requests of the farmers and dairymen of these sections, some of whom had attended previous meetings of this description which we had held, and they wished more instruction in the proper combination of foods, the care of the cow and milk, to produce the largest quantity of milk rich in butter fat that was possible for the food consumed. There is a growing interest among the progressive dairymen in this line; they begin to realize the necessity of utilizing the very best methods if they are to succeed in competition with the western dairymen.

The first institute under the direction of the State Agricultural Society which I attended was held at Chazy, Clinton county, October thirtieth and thirty-first. I was engaged in this work with short intermission from that time until the sixth of May, when the last of these meetings that I attended was held at Westport, Essex county.

My first work in factories, helping the makers, was in Madison county. On account of the cold, dry weather a great many makers had trouble to get the milk of a proper degree of ripeness. The result was that the cheese in many cases were not satisfactory; they lacked body and were harsh and corkey.

We have made an especial point the past season of trying to impress on both makers and patrons the great necessity of having the milk in proper condition if the cheese is to be what the market requires.

The butter-maker that secures a fancy article has found that the more evenly and perfectly the cream is ripened the better his results both in amount of butter recovered by the churn and the quality of the same; this same uniform ripeness of the milk in the case of cheese-making is one of the things the maker must impress upon his patrons.

When the farmer made up his milk at home, if it did not work as it should, he would very soon find the cause and remedy it. Now, after the milk is taken to the factory and mixed with that brought from other farms, it is hard work to convince any patron that his milk was not in good condition and will not make as much and as good cheese as his neighbors.

This was thoroughly exemplified in the case of a factory in the northern part of Oneida county; they had been going from bad to worse and had got to that point where they had concluded that the best thing for them was to close the factory, as the cheese was going on commission and bringing very unsatisfactory prices. The maker did not succeed in locating the trouble and stopping it. I was sent for and found the milk delivered at the factory in very bad condition, some messes being badly tainted while others were so thoroughly chilled with cold water that it was next to impossible to get any development of acid in the curd; this allowed the putrefactive element to develop ahead of the acid and the result was very poor cheese. I took fruit jars and filled partly full of the milk delivered that I was satisfied upon examination was not in good condition, put rennet in each one and screwed on the top and let them float in the fat, shaking them up occasionally as the heating progressed.

The result was that we developed in the fruit cans the same conditions that the maker had been troubled with in the vat; having it that way we could show it to the farmer and convince him that his milk caused the trouble.

The manner of taking care of the milk at one of these farms, which had been the source of a great deal of trouble to the maker, was to set the can in a spring of cold water near the barn when they commenced milking; the result was, when they finished, the milk was cold as ice water, all the animal odors and gases were chilled and condensed and retained in the milk in the morning, the cream was bitter and there was a floating curd in the vat where the milk was put.

When this was shown the farmer so that he could not help but see what the results were, he commenced dipping and airing the milk immediately after milking and stopped the excessive cooling; after that his milk came to the factory in good condition, and so, with all others where they handled their milk as they should, the trouble at the factory stopped.

The salesmen informed me a short time ago that they were selling at the top of the market, and the buyers were anxious to get their cheese.

Rennet Test for Determining the Ripeness of the Milk.

Make a floating tin cup, by leading the bottom with solder, that will hold eleven ounces of milk when two-thirds full; solder a piece of brass on the inside of the cup, marking the eleven ounces; this can float in the vat, and when the temperature reaches eighty-four, put one cubic centimeter of good rennet extract in the eleven ounces of milk; if it will thicken in two minutes the vat of milk is of a proper degree of ripeness, so that it will work along in about the right time. If it takes longer to thicken, the milk should be held until it will thicken in that time.

The first of August I was called to a factory in Cayuga county, where the milk was working badly; it floated and had a very bad flavor. The milk was delivered only once a day, the night milk being kept at home and brought in the morning with the morning milk. It was all cooled down so that it was impossible

to detect any thing particularly wrong with it. I fastened a board on top of the boiler and took a tumbler of each patron's milk and set them on the board and warmed it up. There were fifteen patrons, and eight of the samples were rank and bitter after standing a short time; one floated in the tumbler within an hour. I took a team and visited the farmers and showed them how to take care of the milk by airing and dipping it, and not cooling; the result was better milk the next day, and they have been running all right since then.

It is a fact that if in every factory the farmers and the maker will work together, each doing the best he can, the results cannot help being good if the maker understands his business; if he does not, it is poor economy to keep him because you hire him for a few dollars less than you would pay a good maker. One cause of a great deal of trouble at the factories that I have found during the past summer in some sections, has been the lack of a sufficient supply of water for the cows, owing to the very dry weather in those localities; this produced a feverish condition of the cow, the result was that the milk was badly affected and the cheese was not up to the standard.

The farmers began to find fault and wanted to know why the salesman did not get better prices and why it took so much milk to make a pound of cheese. The farmer would not have to ask this question if he would stop and think and study the conditions; he knows that when the milk is kept at home to make butter, if the cows are not properly fed and watered, that he does not get the amount of butter that he should and the quality is not good.

It is the same in making cheese; if the cow is not given all the water she wants and plenty of good nourishing food she cannot put the solids in the milk; she has no miraculous power of making something out of nothing, so the farmer must not expect the same number of pounds of cheese from his milk, when the cows are poorly fed and insufficiently watered, that he gets when they have good care.

The invention by Professor Babcock, of Wisconsin, of a machine by which the percentage of fat in the milk can be so easily deter-

mined, has given an increased interest in the subject of determining the value of the milk for both butter and cheese by the percentage of fat that it contains. It is very generally conceded that it is correct for the butter factory, but for cheese-making quite a large number of those interested have thought that the caseine should be taken into account as well as the fat, as both enter into the making of cheese.

The past season quite a number of articles have been published in the dairy papers on both sides. Ex-Governor Hoard, of Wisconsin, was very strenuous in the views that the fat should determine the value, it being worth from eighteen cents to twenty cents a pound, while the caseine is worth only two cents, and is largely controlled in quantity by the amount of fat in the milk.

Professor W. W. Cooke, of the Vermont Agricultural Station, has been making some experiments the past season to determine in his own mind the truths of some of these statements. He says that he has used the records of their own station and also all the analyses of milk that give both fat and caseine that have been published by all the experiment stations in the United States.

"In all, somewhat over 2,400 analyses were used to make the deductions upon which I found my conclusions."

If we study the analyses of a few individual cows we will find a wide difference in the proportions of the fat and caseine. The extremes in this direction are represented by the following analyses: No. 1, a registered Jersey; Nos. 2 and 4, registered Holsteins; No. 3A, grade Jersey.

	Total solids	Fat.	Caseine.	Milk-sugar and a-h.	Solids not fat.
Number 1.....	16.26	6.68	4.24	5.34	9.58
Number 2.....	15.31	4.88	4.38	6.05	10.43
Number 3.....	14.59	5.05	3.61	5.93	9.54
Number 4.....	13.17	4.15	4.04	4.93	9.02

From these analyses it is evident that the average relations of fat and caseine can be obtained only by the comparison of a large

number of cows. This has been done and the figures given later are the results of this comparison, and are as follows:

TOTAL SOLIDS.	Fat.	Caseine.	Milk-sugar and ash.
11.00	3.07	2.92	5.01
11.50	3.29	3.00	5.21
12.00	3.50	3.07	5.43
12.50	3.75	3.19	5.56
13.00	3.99	3.30	5.71
13.50	4.34	3.44	5.72
14.00	4.68	3.57	5.75
14.50	4.93	3.79	5.68
15.00	5.38	4.00	5.62
15.50	5.69	4.15	5.66
16.00	6.00	4.30	5.70

The especial thing to be noticed is the relative increase of the fat and caseine; when the fat increases one per cent the caseine does not increase quite one-half of one per cent. Above sixteen per cent of total solids and below eleven per cent there are not many analyses on record, but what there are seem to indicate that below eleven per cent the fat falls rapidly and becomes less than the caseine, while above sixteen per cent the milk-sugar remains constant, the caseine scarcely increases and nearly all the extra solids are composed of fat. It can be said then, in general, that nature tries to keep the caseine as much as possible between three and 3.5 per cent, decreasing more slowly than fat and sugar in poor milk, and increasing less than half as fast as fat in rich milk. It can be said that in normal milk, whether rich or poor, that caseine will average one-fourth of the total solids, though single samples may depart widely from this standard. In conclusion, Professor Cooke says: "From the beginning of the discussion as to the proper way for paying for milk at the cheese factories, I have been in favor of using some double standard which should take into account the caseine in the milk as well as the fat, and, of course, this is theoretically correct and would give true results. The experiment in cheese-making, as it was planned and carried out, was with the expectation that it would show the

necessity of some such double method of computation, but it does in fact show just the opposite, and I shall have to give up that.

By the test the paying for milk at cheese factories according to the per cent of butter fat it contained is substantially correct."

There is no question but what if the plan of paying for the milk at the cheese factory on the basis of the fat that it contained could be generally adopted that it would work a revolution in the factory business.

Instead of being, as it is now, where the patron that gets the most milk is the best fellow, regardless of quality, as long as he keeps within the limit of the law, every man would be working to put solids in the milk as well as getting the quantity and it could not help but be a benefit to the business.

At your suggestion I have made test of the milk with the Babcock test at some of the factories where I have been, and had the cheese analyzed to see how they would show. Following you will find report of the tests which I have made, and afterward had the cheese made from the milk analyzed:

Oneida County Factory, August 14, 1891.

	Pounds.	Per cent of fat.
Amount of milk delivered	125	3.5
Amount of milk delivered	130	3.5
Amount of milk delivered	133	3.6
Amount of milk delivered	63	3.6
Amount of milk delivered	77	4.0
Amount of milk delivered	136	3.3
Amount of milk delivered	382	3.4
Amount of milk delivered	186	3.3
Amount of milk delivered	85	3.8
Amount of milk delivered	219	3.8
Amount of milk delivered	151	3.3
Amount of milk delivered	181	4.2
Amount of milk delivered	396	3.7
Amount of milk delivered	136	3.7
Amount of milk delivered	185	3.7
Amount of milk delivered	165	3.7

Amount of milk delivered	109	3.5
Amount of milk delivered	153	3.5
Amount of milk delivered	223	3.9
Amount of milk delivered	62	4.0
Amount of milk delivered	75	3.3
Amount of milk delivered	79	3.3
Amount of milk delivered	51	4.3
Amount of milk delivered	59	3.9
Amount of milk delivered	192	3.4
Amount of milk delivered	118	3.6
Amount of milk delivered	52	3.8
Amount of milk delivered	148	3.6
Amount of milk delivered	307	3.6
Amount of milk delivered	284	4.0
Amount of milk delivered	598	3.8
Amount of milk delivered	168	3.6
Amount of milk delivered	168	3.6
Amount of milk delivered	49	4.0
Amount of milk delivered	451	3.7
Amount of milk delivered	138	4.0
Amount of milk delivered	67	4.2
Amount of milk delivered	185	4.2
Amount of milk delivered	100	3.3
Amount of milk delivered	113	4.0
Amount of milk delivered	90	3.7
Amount of milk delivered	88	3.9
Amount of milk delivered	133	3.4
Amount of milk delivered	65	3.3
Amount of milk delivered	364	3.4
Amount of milk delivered	191	3.3
Amount of milk delivered	143	4.0
Amount of milk delivered	28	4.0
Amount of milk delivered	179	3.8
Amount of milk delivered	349	3.8
Amount of milk delivered	485	3.5
Amount of milk delivered	225	4.0

Amount of milk delivered.....	185	3.3
Amount of milk delivered.....	316	4.0
Amount of milk delivered.....	83	4.2
Amount of milk delivered.....	446	3.8
Amount of milk delivered.....	201	4.0
Amount of milk delivered.....	584	4.0
Amount of milk delivered.....	200	3.8
Amount of milk delivered.....	500	4.0
Amount of milk delivered.....	528	3.6
	<u>12,082</u>	<u>.....</u>

Amount of cheese, 1,147.

Analysis of cheese:

	Per cent.
Water	32.19
Total solids	67.81
Fat	31.79
Caseine	32.28
Ash	<u>3.24</u>

Babcock Test, Factory in Herkimer county, September 14, 1891.

	Per cent.
No. 1	4.3
No. 2	3.7
No. 3	4.0
No. 4	4.1
No. 5	4.3
No. 6	4.2
No. 7	3.6
No. 8	4.2
No. 9	3.9
No. 10	4.1
No. 11	4.2
No. 12	3.6
No. 13	3.6
No. 14	<u>4.0</u>

Vat, four per cent.

Whey, two-tenths of one per cent.

Four thousand two hundred and thirty-eight pounds of milk.

Four hundred and fifty pounds green cheese.

Four hundred and twenty-six pounds cured cheese.

Milk ripened by rennet test.

Set at a temperature of 84 F.....	8.45 a. m.
Thickened	9.08 a. m.
Cut	9.25 a. m.
Started steam	9.40 a. m.
Temperature 98 F.....	10.45 a. m.
Drew whey one-fourth in acid.....	12.40 p. m.
Ground and salted	3.00 p. m.

Analysis of cheese. Sample taken October 12, 1891:

	Per cent.
Water	29.80
Total solids	70.20
Fat	32.58
Caseine	32.90
Ash	4.92

Babcock Test, Factory in Lewis county, September 30, 1891.

	Per cent.
No. 1	4.0
No. 2	4.1
No. 3	4.2
No. 4	4.2
No. 5	4.7
No. 6	4.7
No. 7	4.5
No. 8	4.0
No. 9	4.2
No. 10	4.2
No. 11	4.2
No. 12	4.0

Vat, four and two-tenths per cent.

Whey, three-tenths of one per cent.

Two thousand seven hundred pounds of milk.

Three hundred and ten pounds green cheese.

Milk ripened and set.....	10.03 a. m.
Two and one-half ounces extract, thickened.....	10.30 a. m.
Cut	10.45 a. m.
Started steam	11.00 a. m.
Temperature, 98 F.....	11.55 a. m.
Drew whey	3.00 p. m.
Ground and salted.....	5.30 p. m.

Two and one-half pounds salt to one thousand pounds milk.

Analysis of cheese. Sample taken November 4, 1891:

	Per cent.
Water	33.50
Solids	64.50
Fat	29.25
Caseine	31.73
Ash	3.52

Test of milk by the Babcock test, factory in Lewis county, and analysis of cheese made from the same. Made October 1, 1891.

Sample taken November 4, 1891, for analysis:

	Per cent.
No. 1	4.2
No. 2	4.4
No. 3. Morning's milk	4.1
No. 3. Night's milk.....	3.6
No. 4	4.0
No. 5	3.9
No. 6. Morning's milk.....	3.8
No. 6. Night's milk.....	3.9
No. 7	2.8
No. 8. Morning's milk.....	3.8
No. 8. Night's milk.....	3.6
No. 9	2.7
No. 10	3.4

No. 11	3.9
No. 12	3.4
No. 13	4.4
No. 14	3.6
No. 15	3.4
No. 16. Morning's milk.....	4.0
No. 16. Night's milk.....	3.9
No. 17	3.8
No. 18	4.4
No. 19	2.5
No. 20	4.0
No. 21	3.7
No. 22	3.8
No. 23	4.0
No. 24	3.6
No. 25	3.6
No. 26	3.9
No. 27	3.5
No. 28	3.6
No. 29	3.9
No. 30	4.4
No. 31	3.6
No. 32	3.8
No. 33	3.9
No. 34	4.3
No. 35	4.4

Vat, four per cent.

Whey, three-tenths of one per cent; three thousand two hundred and seventy-eight pounds milk used; one and one-half ounce Hansen's extract to one thousand pounds milk; ripened milk, so that eleven ounces would thicken in two minutes, with one cubic centimeter of extract.

Set at	9.45 a. m.
Thickened	10.05 a. m.
Cut	10.22 a. m.
Started steam	10.46 a. m.

Temperature 98 F	11.47 a. m.
Drew whey	12.52 p. m.
Ground and salted	4.10 p. m.

Three hundred and seventy-six pounds cheese from press.

Analysis of cheese:

	Per cent
Water	33.88
Total solids	66.12
Fat	29.54
Caseine	33.22
Ash	3.36

Babcock Test, Factory in Lewis county, October 2, 1891.

	Per cent
No. 1	3.8
No. 2	4.4
No. 3	3.8
No. 4	4.5
No. 5	4.4
No. 6	3.5
No. 7	3.8
No. 8	4.0
No. 9	4.5
No. 10	4.0
No. 11	3.9
No. 12	4.3
No. 13	3.5
No. 14	4.4
No. 15	3.6
No. 16	3.8
No. 17	4.8
No. 18	3.8
No. 19	4.3
No. 20	4.0
No. 21	4.0
No. 22	3.9

Vat, four and one-tenth per cent.

Three thousand three hundred and ninety-seven pounds milk ripened to thicken in two minutes by rennet test. Set at 7.42 a. m. Temperature 84 F.; two ounces extract to one hundred pounds milk.

Thickened	7.56 a. m.
Cut at	8.09 a. m.
Started steam	8.35 a. m.
Temperature 98 F	9.36 a. m.
Drew whey	12 m.
Ground and salted	2.45 p. m.

Put to press at a temperature of 76 F.; salted two and one-half pounds to one thousand pounds milk; three hundred and ninety-four pounds cheese from the press.

Analysis of cheese November 4, 1891:

	Per cent.
Water	28.75
Total solids,	71.24
Fat	33.91
Caseine	33.32
Ash	4.01

Babcock Test, Factory in Oneida county, September 25, 1891.

	Per cent.
No. 1	3.6
No. 2	3.5
No. 3	3.2
No. 4	3.2
No. 5	3.4
No. 6	3.0
No. 7	3.6
No. 8	3.2
No. 9	3.8
No. 10	3.8
No. 11	3.4
No. 12	4.1
No. 13	4.3
No. 14	3.8

No. 15	3.7
No. 16	3.3
No. 17	3.6
No. 18	3.2
No. 19	3.8
No. 20	3.7
No. 21	4.0
No. 22	3.6
No. 23	4.3
No. 24	3.4
No. 25	3.5
No. 26	3.8
No. 27	3.6
No. 28	3.6
No. 29	3.4
No. 30	3.8
No. 31	4.6
No. 32	3.8
No. 33	2.9
No. 34	2.6
No. 35	3.6
No. 36	3.4
No. 37	3.4
No. 38	3.6
No. 39	3.5
No. 40	3.6
No. 41	3.9
No. 42	3.4
No. 43	3.4
No. 44	3.6
No. 45	3.8
No. 46	4.1
No. 47	4.1
No. 48	3.4
No. 49	4.2

Vat, three-sevenths per cent.

Whey two-tenths of one per cent. Set with rennet prepared at the factory.

Three thousand two hundred pounds milk.

Three hundred and twelve pounds cured cheese.

Temperature 84 F	8.51 a. m.
Thickened	8.51 a. m.
Cut	9.05 a. m.
Stirred	9.12 a. m.
Started steam	9.20 a. m.
Temperature, 90 F	9.48 a. m.
Temperature, 98 F	10.20 a. m.
Drew whey	12.20 p. m.
Ground and salted	3.40 p. m.

Salted two and one-half pounds one thousand pounds milk.

Analysis sample of cheese taken October 24, 1891:

Water	24.46
Total solids	75.54
Fat	34.31
Caseine	37.16
Ash	4.07

Night skim made October first:

Water	30.10
Total solids	69.90
Fat	20.54
Caseine	45.21
Ash	4.15

Test of dairy cows May fourteenth, before turning out to grass, and the same dairy June fifth, after they went out to grass:

	May 14th. Per cent.	June 5th. Per cent.
No. 1	3.2	3.8
No. 2	2.9	3.6
No. 3	3.3	4.0

No. 4	3.8	4.4
No. 5	3.4	3.8
No. 6	3.4	4.1
No. 7	3.2	3.6
No. 8	3.6	4.2
No. 9	3.5	4.0
No. 10	2.8	3.7
No. 11	2.8	3.5
No. 12	3.4	4.6
No. 13	3.6	5.0
No. 14	3.4	4.1
Average	<u>3.28</u>	<u>4.02</u>

Mixed night's milk from can, three and two-tenths per cent.

This shows the difference in the quality of the milk made by the food. In the first place the cows had fairly good hay without grain; at the second test they were on good pasture without grain. The quantity nearly doubled and the quality three-fourths of one per cent better.

In addition to this work, I went to the experiment station at Geneva, under your instructions, to make cheese there for the purpose of experimenting. The object of these experiments was to study all the conditions that affect the composition and quality of the cheese. We made cheese upon eight different days, commencing September nineteenth. I was assisted by W. W. Hall, a cheese-maker of this department, in making cheese on the nineteenth, twentieth, twenty-first and twenty-second; during the remainder of the time I made the cheese alone.

The report of the work thus performed, and such additional work as was required chemically to ascertain all the facts desired to place before the public, has been reported by the experimental station in bulletin No. 37 of the new series. In reporting this work, I shall be obliged to use largely, if not entirely, the report made in the bulletin referred to, as it sets forth clearly and distinctly the work I there performed in connection with the experiment station.

The special objects of this investigation were to ascertain:

First. How much fat can be readily worked into cheese.

Second. What influence varying amounts of fat in milk have upon the amount of fat and of nitrogen compounds that can be recovered in cheese.

Third. Whether there is any better recovery of fat or of nitrogen compounds in stirred-curd process of manufacture than in the Cheddar process.

Fourth. Whether there is any difference in the use of commercial rennet-extract and of home made rennet-extract.

Fifth. What general changes in composition take place in the ripening or curing of cheese.

While, in most respects, fairly definite results were obtained it must be kept in mind that the experiments so far are few in number and can scarcely justify any broad conclusions. The results of this first series of experiments should be looked upon mainly as valuable suggestions for future work; and, if the results of several series of investigations made under varying conditions agree, then we may be able to state definite general conclusions, which may be regarded as established facts.

Composition of Milk and Cheese.

In order that the analyses of milk, whey and cheese contained in this bulletin, may be intelligible to cheese-makers and to others who do not chance to be acquainted with the composition of milk, cheese, etc., it is desirable to present some of the main facts in this connection.

The following outline gives the names of the constituents found in milk and its derived products, as they are usually reported in analysis:

1. Water.

2. Total solids.

1. Fat.

2. Solids not fat.

(1) Nitrogen compounds (caseine, albumen, etc.)

(2) Sugar.

(3) Ash.

1. Water and total solids. The compounds contained in milk, cheese, etc., can be divided into two general classes. The first class includes the single compound, water. The second class includes the total solids, by which we mean all the compounds except water. The amount of total solids is found by evaporating the water, the portion left after evaporation being the total solids. The amount of water and total solids in milk varying considerably according to the breed of cow, period of lactation, food, etc.

The amount of water in milk may vary from eighty to ninety pounds per hundred, the average in normal milk being about eighty-seven pounds per hundred. The amount of total solids may vary from ten to twenty pounds per hundred, the average being not far from thirteen pounds per hundred.

The total solids are usually divided into two classes, (1st) fat and (2d) solids not fat.

2. The fat of milk, butter, cheese, etc., consists of a mixture of several compounds, each of which contains glycerine united with some acid. The more important of these compounds contained in the fat of milk, cheese, butter, etc., are the following:

- (1) Olein (glycerine united with olein acid).
- (2) Palmitin (glycerine united with palmitic acid).
- (3) Stearin (glycerine united with stearic acid).
- (4) Butyrin (glycerine united with butyric acid).

A large proportion of olein or of butyrin in a fat makes a soft or easily melting fat, while a large proportion of palmitin or stearin makes a hard fat. The amount of fat in milk may vary from two to ten pounds per hundred of milk, the average amount being not far from three and five-tenths pounds per hundred. Butter contains from eighty to eighty-five pounds of fat per hundred, while cheese may contain all the way from three pounds of fat per hundred pounds of cheese, as in skim-cheese, to sixty pounds per hundred, as in cream cheese. The average amount of fat in cheese made from normal milk averages thirty pounds or more per hundred.

3. The solids, not fat, in milk, cheese, etc., include all the solids except the fat, and these are (first) the nitrogen compounds, chief of which are caseine and albumen; (second) milk sugar; (third) ash.

(1.) Caseine and albumen are known as nitrogen or nitrogenous compounds, because they contain, in addition to other elements, the element nitrogen, which the other compounds of milk do not contain. These nitrogen compounds are often called also albuminoids, because they closely resemble in composition the albumen or white of an egg. They are sometimes called proteids also.

The two principal nitrogen compounds or albuminoids in milk are caseine and albumen, and these compounds are the only ones we shall notice in this connection. Caseine and albumen are of more especial interest to the cheese-maker than any other constituents in the milk. Of these two compounds the caseine is the most important. Caseine and albumen differ in their chemical properties in two important respects.

(1.) Albumen is not coagulated or solidified by acids or by action of rennet, while caseine is coagulated.

Albumen is coagulated by heat, while caseine is not. These properties of caseine and albumen have a practical bearing upon cheese-making, since by the action of rennet we can coagulate the caseine and retain it in the curd, while the albumen passes into the whey more or less completely and is lost to the cheese. The amount of caseine and albumen together in normal milk may vary from below three to over four pounds per hundred, the average amount being a little short of three and five-tenths pounds per hundred.

(2.) Milk-sugar has essentially the same composition as ordinary cane sugar, but the former is less soluble and less sweet than the latter. Milk-sugar is acted upon by certain micro-organisms or minute germs, or, as we commonly say, it ferments, forming, as one of its chief products, lactic acid, the characteristic acid of sour milk. The sugar, in the process of cheese-making, passes mostly into the whey. In some few places the milk-sugar is obtained from the whey and converted into an article of commerce, for which there is a limited demand, but in most cases

no attempt is made to recover it. The amount of sugar in milk averages not far from five pounds per hundred.

(3.) The ash in milk consists of what is left after milk is burned as completely as possible. It contains compounds made up of such elements as calcium, phosphorous, potassium, sodium, magnesium, oxygen, sulphur, chlorine, iron, etc. A large part of the ash constituents are lost in the whey. The average amount of ash in milk is about three-fourths of one pound per hundred pounds of milk. The calcium (or lime) compounds in milk are of especial importance in connection with the process of cheese-making, since it has been recently shown that rennet will not coagulate the caseine of milk unless some soluble calcium compound is present, though it is not clearly understood in exactly what way the calcium compounds influence the action of rennet.

The following table will give a fair idea of the average composition of normal milk:

Water	87.2
Total solids	12.8
Fat	3.8
Solids not fat	9.0
Caseine and albumen	3.3
Sugar	5.0
Ash	0.7

Plan of Investigation.

The milk.—The milk used in the different experiments was mixed milk of various breeds of cows. In some cases it consisted of milk from two to three days' milkings, while in most cases it consisted mainly of fresh morning milk mixed with milk of the previous evening. The details regarding the character of the milk used are stated later in the description of the individual experiments. The amount of fat in the milk was regulated by skimming or adding cream, according to the condition desired; the amount of fat was determined by the Babcock test, and if the per cent of fat was not found to be approximately the one desired, then cream or skim-milk was added and the mixture tested again,

until the desired result was obtained. Only two tests were usually required and in some cases the approximate amount was hit upon at the first trial. Special care was taken in sampling the milk for analysis; and, as the amount of milk used was not large, no difficulty was experienced in getting thoroughly representative samples.

Description of whey.—The whey was sampled at three different stages of the work, being called in the analytical tables first whey, second whey, and third whey. The first whey included a great bulk of whey which was first drawn from the curd. The second whey included the portion that drained from the curd as soon as the whey running from the curd was no longer clear but became turbid and white in appearance. The amount was not large in any case, and in one or two cases, where the amount of fat in the milk was small, only clear whey drained from the curd. The third whey included the portion that drained from the curd after salt was added and also the drainings from the press. Any fat that came from the cheese by pressure was carefully rinsed by hot water into the third whey. The amount of whey was small in most cases and an accurate determination of the fat was difficult, as the fat accumulated on the surface of the whey in a separate layer. In the sixth experiment the third whey was lost by accident before being sampled.

Analysis of curd.—In several of the experiments the curd was analyzed, but, as it proved difficult to get representative samples, the analysis was abandoned. The chief difference in composition between the curd and green cheese is mainly in moisture and salt, and, in a much lesser degree, in fat and nitrogen compounds.

Analysis of cheese.—In six experiments the first analysis of the cheese was made when the cheese was seven days old; in two experiments the green cheese as it came from the press was sampled for analysis. In all experiments each cheese was analyzed at the age of seven, twenty-one and thirty-five days, in order to ascertain the general changes taking place before cheese goes to market.

Difficulties Connected with the Investigation.

The principal source of difficulty in carrying on the work has been sampling of the cheese for analysis. It is highly desirable to get for analysis such a sample as will fairly represent the composition of the whole cheese. If a cheese could be cut up and portions selected here and there, the difficulty would be largely removed. But where it is necessary to preserve the cheese to continue the study of its composition through a period of several months, such a course is not feasible. The only practicable method, and the one employed, has been to use a regular cheese trier which takes out a cylinder of cheese about six inches long and five-eighths of an inch in diameter. The samples were taken from the cheese at points about half way between the center and circumference of the flat surface or face of the cheese. The cylinders thus taken out are cut up into very thin pieces and the whole carefully mixed, pains being taken to prevent loss of moisture in the operation. From samples thus prepared portions are weighed out for analysis. By comparing the pounds of constituents in the cheese, as given by analysis of different samples of the same cheese, it will be noticed that in several instances the results are not consistent. For example, in the sixth experiment, the amount of caseine in the cheese as obtained by analysis of different samples, taken at different times, is as follows: In green cheese, 9.1 pounds; in cheese seven days old, 8.68 pounds; in cheese twenty-one days old, 9.26 pounds; in cheese thirty-five days old, 8.5 pounds. It is improbable, not to say impossible, that the amount of caseine should vary so irregularly merely as a result of the ripening process. We can readily account for it only on the ground that there was a real difference in the samples analyzed. Irregular variation of other constituents is also noticeable. This is perhaps not surprising when we consider that a cheese is often more porous in some places than in others; that some of the pores are often filled with water or with pure fat; that the amount of moisture varies in different portions.

The determination of total solids gave considerable difficulty, while those of fat and nitrogen were, on the whole, fairly satisfac-

tory. It will be noticed that the ash varies in a remarkable manner. Special pains were taken in experimenting with a large number of ash determinations, but uniform results were difficult to obtain from different samples. The amount of ash constituents in a cheese should not vary, as they cannot escape from the cheese in the process of ripening, and the pounds of ash should remain the same from week to week. From the decided variations found in different samples, we are led to believe that the salt is not distributed through the cheese with sufficient uniformity to enable one to make an accurate analysis for the whole cheese from one sample.

One series of experiments was made in which analyses of samples taken from the flat surface of the cheese were compared with those taken from the middle of the side. In some instances the agreement was fair, while in others the variation was marked. It is planned to make a more thorough examination of samples taken from different parts of cheese in order to see to what extent and in what manner different portions vary. In addition to the difficulty of securing samples that represent the composition of the whole cheese, the methods of cheese analysis are imperfect in some respects.

Notes of Analytical Methods.

Determinations of fat in cheese made by the Babcock method were compared with those made by the gravimetric method. Satisfactory duplicates were not obtained by the Babcock method, nor did the results agree closely with the laboratory method, and its use was abandoned as not being sufficiently accurate for this special work. All the determinations of fat were made by the gravimetric method.

The determinations of acid in whey were made immediately after the samples were taken and were calculated as lactic acid.

In the tables containing analytical data, the actual number of pounds of ash and sugar is omitted, since the data are of no special value in this investigation. If any one is interested to learn the amounts, the data necessary for their calculation are in the tables.

In the detailed description of the individual experiments following, the experiments are arranged, not in chronological order, but according to the amount of fat in the milk used in each experiment, commencing with the lowest. This arrangement will make reference to the tables more convenient than an arrangement in chronological order.

First Experiment.

1. Date.—September 19, 1891.

2. Kind of cheese.—Stirred-curd.

3. Description of milk used.—Morning milk, fresh, 61.56 pounds; evening milk, twelve hours old, 234.38 pounds; from which were taken 55.54 pounds of cream, leaving, for use in the experiment, of mixed whole-milk and skim-milk, 240.4 pounds.

4. Details of process of manufacture.—Temperature of milk at beginning, 60 degrees F.; commenced to heat at 9.50 a. m.; temperature of 86 degrees F. reached at 10.25; Hansen's rennet-extract added at 10.30; milk began to thicken at 10.46; curd cut at 11, and then stirred; commenced to heat again at 11.05; temperature of 93 degrees F. reached at 11.30; whey drawn from curd at 1.06 p. m.; curd drained until 2.05 and then salted with 0.48 pounds of salt; curd put to press at 3.10. Amount of green cheese, 23.5 pounds.

ANALYSES CONNECTED WITH THE FIRST EXPERIMENT.

	COMPOSITION EXPRESSED IN PARTS PER HUNDRED.							COMPOSITION EXPRESSED IN POUNDS.					
	Per cent of water.	Per cent of total solids.	Per cent of fat.	Per cent of caseine and albumen.	Per cent of ash.	Per cent of lactic acid.	Per cent of sugar.	Pounds.	Pounds of water.	Pounds of total solids.	Pounds of fat.	Pounds of caseine and albumen.	Pounds of lactic acid.
Milk	88.88	11.67	2.85	8.84	0.83	....	5.15	240.4	212.84	28.06	5.65	8.03	.....
First whey	94.16	5.84	0.17	0.79	0.82	0.18	3.88	206.8	194.25	12.05	0.85	1.63	0.87
Second whey													
Third whey.	89.96	10.04	0.26	1.08	3.39	....	5.31	6.63	5.96	0.67	0.02	0.07	.....
Cheese, green .....	.....	.....	.....	.....	.....	.....	.....	23.5	.....	.....	.....	.....	.....
Cheese, seven days	42.64	57.36	24.28	27.59	3.42	1.17	....	22.9	9.76	13.14	5.56	6.31	0.27
Cheese, twenty-one days	42.22	57.88	23.47	26.60	2.88	1.06	....	22.28	9.40	12.88	5.23	5.92	0.24
Cheese, thirty-five days	41.15	58.85	23.27	28.72	3.52	0.76	....	21.75	8.95	12.80	5.06	6.25	0.17

Second Experiments.

1. Date.—September 22, 1891.

2. Kind of cheese.—Stirred-curd.

3. Description of milk used.—Morning milk, twenty-four hours old, 46.44 pounds; evening milk, twelve hours old, 246.56 pounds; “starter” added, 7 pounds. Total amount of milk used in this experiment, 300 pounds.

4. Details of process of manufacture.—Temperature of milk at beginning, 65 degrees F.; commenced to heat at 9.14 a. m.; temperature of 84 degrees F. reached at 9.55; three-fourths of an ounce of Hansen’s rennet-extract added at 10; milk began to thicken at 10.11; commenced to cut curd at 10.20; commenced to stir at 10.25; commenced to heat at 10.40; temperature of 96 degrees F. reached at 11.25; whey drawn from curd at 12.20 p. m.; curd drained until 2; 0.75 pounds of salt added; curd put to press at 3.35. Amount of green cheese, twenty-nine pounds.

ANALYSES CONNECTED WITH THE SECOND EXPERIMENT.

	COMPOSITION EXPRESSED IN PARTS PER HUNDRED.							COMPOSITION EXPRESSED IN POUNDS.					
	Per cent of water.	Per cent of total solids.	Per cent of fat.	Per cent of caseine and albumen.	Per cent of ash.	Per cent of lactic acid.	Per cent of sugar.	Pounds.	Pounds of water.	Pounds of total solids.	Pounds of fat.	Pounds of caseine and albumen.	Pounds of lactic acid.
Milk	88.44	11.56	3.01	2.81	0.99	....	4.75	300	265.32	34.68	9.03	8.43	....
First whey	92.65	7.35	0.21	0.54	1.01	0.17	5.42	251	232.55	18.45	0.53	1.85	0.43
Second whey	92.41	7.59	0.23	0.81	1.07	0.26	5.28	12.1	11.18	0.92	0.08	0.20	0.08
Third whey	89.45	10.55	0.53	1.20	6.58	....	2.24	4.68	4.18	0.50	0.02	0.06	....
Cheese, green .....	....	....	....	....	....	....	....	29	....	....	....	....	....
Cheese, seven days	37.71	62.29	29.61	23.24	3.67	0.69	....	28	10.56	17.44	8.29	6.51	0.19
Cheese, twenty-one days	36.98	63.02	29.97	24.88	3.79	0.79	....	27.25	10.08	17.17	8.17	6.64	0.21
Cheese, thirty-five days	36.35	63.65	30.62	27.49	4.20	0.65	....	26.55	9.66	16.90	8.13	7.30	0.17

Third Experiment.

1. Date.—September 18, 1891.

2. Kind of cheese.—Stirred-curd.

3. Description of milk used.—Evening milk, twelve hours old, 236.69 pounds, from which 14.5 pounds of cream were taken, leaving 229.19 pounds for experiment; fresh morning milk, 58.71 pounds; "starter," 4 pounds. Total amount of mixed whole-milk and skim-milk used in this experiment 284.9 pounds.

4. Details of process of manufacture.—Temperature of milk at beginning, 77 degrees F.; commenced to heat at 9.34 a. m.; temperature of 85 degrees F. reached at 9.50; "starter" added at 9.48, and seven-eighths of an ounce of rennet-extract at 9.50; milk began to thicken at 10; commenced to cut curd at 10.04 and to stir at 10.08; commenced to heat again at 10.24; temperature of 97 degrees F. reached at 11.40; whey drawn from curd at 12.25 p. m.; curd drained until 1.45; 0.75 pounds of salt added; curd put to press at 3.50. Amount of green cheese, 31.13 pounds.

ANALYSES CONNECTED WITH THE THIRD EXPERIMENT.

	COMPOSITION EXPRESSED IN PARTS PER HUNDRED.							COMPOSITION EXPRESSED IN POUNDS.					
	Per cent of water.	Per cent of total solids.	Per cent of fat.	Per cent of caseine and albumen.	Per cent of ash.	Per cent of lactic acid.	Per cent of sugar.	Pounds.	Pounds of water.	Pounds of total solids.	Pounds of fat.	Pounds of caseine and albumen.	Pounds of lactic acid.
Milk	87.47	12.53	3.88	3.45	0.91	...	4.29	284.9	249.2	35.7	11.05	9.88	....
First whey.....	93.30	6.70	0.31	1.04	0.58	0.16	4.61	233.2	217.57	15.63	0.72	2.48	0.37
Second whey.....	93.14	6.86	0.43	1.28	0.74	0.26	4.15	12.4	11.55	0.85	0.05	0.17	0.08
Third whey	85.99	14.01	0.60	1.36	5.96	...	6.09	4.1	3.53	0.57	0.02	0.06	....
Cheese, green .....	...	...	...	...	...	...	...	31.13	.....	.....	.....	.....	.....
Cheese, seven days	35.09	64.91	34.60	24.37	3.09	1.27	...	30.08	10.54	19.49	10.89	7.32	0.88
Cheese, twenty-one days ..	34.88	65.12	33.91	24.77	3.26	0.92	...	29.40	10.26	19.14	9.97	7.28	0.27
Cheese, thirty-five days...	34.53	65.47	34.96	25.65	3.88	0.72	...	28.80	9.94	18.86	10.06	7.38	0.21

Fourth Experiment.

1. Date.— October 9, 1891.

2. Kind of cheese.— Cheddar.

3. Description of milk used.— Evening milk, thirty-six hours old, 64.31 pounds, from which 12.75 pounds of cream were taken, leaving 51.56 pounds of skim milk for use in experiment; evening milk, twelve hours old, 34.99 pounds, from which 5.78 pounds of cream were taken, leaving 29.21 pounds of skim-milk for experiment; evening milk, twelve hours old, 123.5 pounds; fresh morning milk, 71.38 pounds; cream, 15 pounds; "starter," 6.65 pounds. Total amount of whole-milk, skim-milk and cream used in this experiment, 297.3 pounds.

4. Details of process of manufacture.— Temperature of milk at beginning 61 degrees F.; commenced to heat at 8.45 a. m.; temperature of 85 degrees F. reached at 9.20; three-fourths of an ounce of rennet-extract added at 9.44; milk began to thicken at 9.52; commenced to cut curd at 10.02, and to stir at 10.07; commenced to heat again at 10.25; temperature of 98 degrees F. reached at 11.18; whey drawn from curd at 12.40 p. m.; curd drained until 3.35, then salted and ground; 0.75 pounds of salt added; curd put to press at 3.50. Amount of green cheese, 36.31 pounds.

ANALYSIS CONNECTED WITH THE FOURTH EXPERIMENT.

	COMPOSITION EXPRESSED IN PARTS PER HUNDRED.							COMPOSITION EXPRESSED IN POUNDS					
	Per cent of water	Per cent of total solids.	Per cent of fat.	Per cent of caseine and albumen.	Per cent of ash.	Per cent of lactic acid.	Per cent of sugar.	Pounds.	Pounds of water.	Pounds of total solids.	Pounds of fat.	Pounds of caseine and albumen.	Pounds of lactic acid.
Milk	87.57	12.48	3.96	3.81	0.88	....	8.78	297.3	260.85	36.95	11.77	11.33	....
First whey	98.76	6.24	0.81	1.07	0.61	0.17	4.08	240.19	225.2	14.99	0.74	2.57	0.41
Second whey	93.22	6.78	0.44	0.85	0.71	0.24	4.54	14.81	18.34	0.97	0.06	0.12	0.08
Third whey	90.98	9.07	0.95	1.24	4.88	0.65	1.85	4.25	3.86	0.39	0.04	0.05	0.08
Cheese, green	38.26	61.74	29.91	22.72	3.72	0.58	....	36.81	18.89	22.42	10.86	8.25	0.21
Cheese, seven days	37.33	62.67	31.19	23.12	3.44	0.46	....	35.28	19.17	22.11	11.00	8.16	0.16
Cheese, twenty-one	38.01	61.99	29.51	24.38	3.78	0.42	....	34.16	12.98	21.18	10.08	8.33	0.14
Cheese, thirty-five days ..	37.49	62.51	30.87	23.69	2.65	0.53	....	33.44	12.54	20.90	10.32	7.92	0.17

Fifth Experiment.

1. Date.—September 17, 1891.

2. Kind of cheese.—Stirred-curd.

3. Description of milk used.—Morning milk, forty-eight hours old, 32.56 pounds; evening milk, thirty-six hours old, 45.06 pounds; morning milk, twenty-four hours old, 72.56 pounds; evening milk, twelve hours old, 108.44 pounds; fresh morning milk, 63.19 pounds; "starter," 4 pounds. Total amount of milk used in this experiment, 325.8 pounds.

4. Details of process of manufacture.—Temperature of milk at beginning, 63 degrees F.; commenced to heat at 9.20 a. m.; temperature of 84 degrees F. reached at 9.45; "starter" added at 9.45 and then one ounce of rennet-extract; milk began to thicken at 9.59; commenced to cut curd at 10.08; and to stir at 10.14; commenced to heat again at 10.31; temperature of 98 degrees F. reached at 11.29; whey drawn from curd at 1.20 p. m.; curd drained until 2.20; 0.81 pounds of salt added; curd put to press at 4. Amount of green cheese, 38.6 pounds.

ANALYSES CONNECTED WITH THE FIFTH EXPERIMENT.

	COMPOSITION EXPRESSED IN PARTS PER HUNDRED.						COMPOSITION EXPRESSED IN POUNDS.						
	Per cent of water.	Per cent of total solids.	Per cent of fat.	Per cent of caseine and albumen.	Per cent of ash.	Per cent of lactic acid.	Per cent of sugar.	Pounds.	Pounds of water.	Pounds of total solids.	Pounds of fat.	Pounds of caseine and albumen.	Pounds of lactic acid.
Milk	86.42	13.58	4.60	3.91	0.65	....	4.32	325.8	281.56	44.24	15.1	12.73	....
First whey	98.10	6.90	0.41	1.24	0.59	0.21	4.45	266.2	247.83	18.37	1.09	3.30	0.56
Second whey	92.54	7.46	0.56	1.03	0.61	0.30	4.96	7.8	7.22	0.58	0.04	0.08	0.02
Third whey	89.29	10.71	1.04	0.99	5.25	....	3.43	3.5	3.13	0.37	0.04	0.03	....
Cheese, green .....	....	....	....	....	....	....	....	38.6	....	....	....	....	....
Cheese, seven days	33.68	66.32	35.32	24.32	3.45	0.64	....	37.3	12.56	24.74	13.17	9.07	0.24
Cheese, twenty-one days	33.36	66.64	36.47	24.84	3.76	0.73	....	36.6	12.21	24.39	13.35	9.09	0.27
Cheese, thirty-five days	33.20	66.80	35.98	25.08	5.29	0.54	....	36.06	11.97	24.09	12.97	9.04	0.19

Sixth Experiment.

1. Date.— October 8, 1891.
2. Kind of cheese.— Cheddar.
3. Description of milk used.— Morning milk, forty-eight hours old, 24.81 pounds, from which were taken 5.31 pounds cream, the cream alone being used for the experiment; evening milk, thirty-six hours old, 52.56 pounds; morning milk, twenty-four hours old, 72.75 pounds, from which were taken 15.88 pounds cream, all the cream and 40 pounds of the skim-milk being used; evening milk twelve hours old, 127.13 pounds; fresh morning milk, 68.68 pounds; "starter," 8 pounds. Total amount of whole-milk, skim-milk and cream used for the experiment, 317.56 pounds.
4. Details of process of manufacture.— Temperature of milk at beginning, 61 degrees F.; commenced to heat at 9.30 a. m.; temperature of 84 degrees F. reached at 10; three-fourths of an ounce of rennet-extract added at 10.20; milk began to thicken at 10.31; commenced to cut curd at 10.40 and stir at 10.47; commenced to heat again at 11; temperature of 97 degrees F. reached at 11.55; whey drawn from curd at 12.30 p. m.; curd drained until 3.30; 0.81 pounds of salt added at 3.30; curd ground at 3.40 and put to press at 4.05. Amount of green cheese, 41.56 pounds.

ANALYSES CONNECTED WITH THE SIXTH EXPERIMENT.

	COMPOSITION EXPRESSED IN PARTS PER HUNDRED								COMPOSITION EXPRESSED IN POUNDS.				
	Per cent of water.	Per cent of total solids	Per cent of fat.	Per cent of caseine and albumen	Per cent of ash.	Per cent of lactic acid.	Per cent of sugar.	Pounds	Pounds of water.	Pounds of total solids.	Pounds of fat.	Pounds of caseine and albumen.	Pounds of lactic acid.
Milk	85.72	14.28	4.78	3.53	0.93	....	5.09	317.56	272.21	45.35	15.02	11.21	....
First whey	92.92	7.08	0.39	0.75	0.54	0.16	5.24	249.47	231.81	17.66	0.97	1.87	0.40
Second whey	92.04	7.96	0.19	1.12	0.68	0.25	5.71	16.00	14.78	1.27	0.03	0.18	0.04
Third whey .....	.....	.....	.....	.....	.....	.....	.....	4.78	.....	.....	.....	.....	.....
Cheese, green	87.60	62.40	33.53	21.91	8.11	0.62	....	41.56	15.63	25.93	13.93	9.10	0.26
Cheese, seven days	88.00	62.00	34.81	21.47	2.97	0.52	....	40.40	15.36	25.06	14.07	8.68	0.21
Cheese, twenty-one days ..	86.13	63.87	34.89	22.56	5.14	0.56	....	39.30	14.20	25.10	13.71	9.26	0.22
Cheese, thirty-five days ..	87.88	62.12	34.79	22.10	4.40	0.54	....	38.47	14.57	23.90	13.38	8.50	0.20

Seventh Experiment.

1. Date.—September 23, 1891.

2. Kind of cheese.—Stirred-curd, using home-made rennet-extract.

3. Description of milk used.—Morning milk, twenty-four hours old, 67.75 pounds; evening milk, twelve hours old, 243.88 pounds; "starter," 4.67 pounds. Total amount of milk used in this experiment, 316.3 pounds.

4. Details of process of manufacture.—Temperature of milk at beginning, 72 degrees F.; commenced to heat at 9.10 a. m.; temperature of 82 degrees F. reached at 9.35; "starter" added at 9.35; one-sixth of whole solution prepared fresh from one rennet added at 9.45; commenced to cut curd at 10.04, and to stir at 10.12; commenced to heat again at 10.25; temperature of 97 degrees F. reached at 11.20; whey drawn from curd at 1.15 p. m.; curd drained until 1.45; 0.63 pounds of salt added at 1.45; curd put to press at 3.10. Amount of green cheese, 38.8 pounds.

ANALYSES CONNECTED WITH THE SEVENTH EXPERIMENT.

	COMPOSITION EXPRESSED IN PARTS PER HUNDRED.							COMPOSITION EXPRESSED IN POUNDS.					
	Per cent of water.	Per cent of total solids.	Per cent of fat.	Per cent of caseine and albumen.	Per cent of ash.	Per cent of lactic acid.	Per cent of sugar.	Pounds.	Pounds of water.	Pounds of total solids.	Pounds of fat.	Pounds of caseine and albumen.	Pounds of lactic acid.
Milk.....	86.31	13.69	4.80	3.24	1.03	....	4.63	316.8	273	43.3	15.18	10.25	....
First whey.....	92.56	7.44	0.40	0.92	1.20	0.25	4.67	252	233.25	18.75	1.01	2.33	0.63
Second whey.....	92.06	7.94	0.77	1.08	1.37	0.39	4.38	15.8	14.55	1.25	0.12	0.16	0.08
Third whey.....	87.12	12.88	0.69	1.26	6.55	....	4.38	6.63	5.32	0.86	0.05	0.08	....
Cheese, green.....	....	....	....	....	....	....	....	38.8	....	....	....	....	....
Cheese, seven days.....	35.89	64.11	33.61	21.41	2.80	0.70	....	37.75	13.43	24.07	14.50	8.04	0.23
Cheese, twenty-one days..	35.67	64.33	33.32	22.55	2.70	0.65	....	36.09	12.87	23.22	14.01	8.14	0.23
Cheese, thirty-five days..	36.05	63.95	33.50	23.53	3.11	0.62	....	35.19	12.68	22.51	13.90	8.28	0.21

Eighth Experiment.

1. Date.—September 21, 1891.

2. Kind of cheese.—Stirred-curd.

3. Description of milk used.— Cream sixty hours old, 43 pounds; cream, forty-eight hours old, 12 pounds; cream, twenty-four hours old, 9 pounds; morning milk, twenty-four hours old, 29 pounds; cream, twelve hours old, 10 pounds; evening milk, twelve hours old, 237 pounds. Total amount of milk and cream used in this experiment, 340 pounds.

4. Details of process of manufacture.— Temperature of milk at beginning, 65 degrees F.; commenced to heat at 9.28 a. m.; temperature of 82 degrees F. reached at 9.52; one ounce and one-eighth of rennet-extract added at 9.53; milk began to thicken at 10.03; commenced to cut curd at 10.12 and to stir at 10.18; commenced to heat again at 10.30; temperature of 97 degrees F. reached at 11.25; whey drawn from curd at 1 p. m.; curd drained until 1.35; 1.2 pounds of salt added; curd put to press at 3.30. Amount of green cheese, 46.7 pounds.

ANALYSES CONNECTED WITH THE EIGHTH EXPERIMENT.

	COMPOSITION EXPRESSED IN PARTS PER HUNDRED.							COMPOSITION EXPRESSED IN POUNDS.					
	Per cent of water.	Per cent of total solids.	Per cent of fat.	Per cent of caseine and albumen.	Per cent of ash.	Per cent of lactic acid.	Per cent of sugar.	Pounds.	Pounds of water.	Pounds of total solids.	Pounds of fat.	Pounds of caseine and albumen.	Pounds of lactic acid.
Milk	88.90	16.10	6.49	3.87	0.67	...	5.57	840	285.26	54.74	22.07	11.46	...
First whey	93.14	6.86	0.76	0.96	0.63	0.20	4.81	267.1	248.78	18.32	2.08	2.56	0.53
Second whey	92.86	7.14	0.57	1.18	0.71	0.29	4.39	9.4	8.78	0.67	0.05	0.12	0.08
Third whey	85.17	14.83	4.81	0.87	3.89	...	5.26	7.25	6.17	1.08	0.85	0.07	...
Cheese, green .....	...	...	...	...	...	...	...	46.7	...	...	...	...	...
Cheese, seven days	81.95	68.05	43.53	17.28	3.22	0.58	...	45.1	14.41	30.69	19.63	7.79	0.26
Cheese, twenty-one days ..	82.85	67.65	44.94	17.86	2.92	0.72	...	43.5	14.07	24.43	19.55	7.76	0.81
Cheese, thirty-five days ..	82.23	67.77	45.86	18.45	3.61	0.51	...	42.56	13.72	28.84	19.30	7.85	0.22

Ninth (Factory) Experiment.

On September twenty-fifth, Mr. G. A. Smith superintended the making of cheese at the factory of Mr. G. Merry at Verona, N. Y. A small cheese made from the lot of milk was sent to the station by Mr. Merry. Mr. Smith tested the milk and whey for fat by the Babcock test and sent samples of milk, whey and curd to the station for analysis; but owing to long delay in reaching the station, the samples of milk and whey were not in a fit condition to yield satisfactory results. The curd was analyzed, also the cheese at three and five weeks. The results which are, of necessity, fragmentary, are given here.

1. Date.— September 25, 1891.
2. Kind of cheese.— Cheddar.
3. Description of milk used.— Mixed factory milk, 3,200 pounds.
4. Details of process of manufacture.— Rennet added at 8.31 a. m.; curd cut at 9.05; commenced to heat second time at 9.20; temperature of 99 degrees F. reached at 10.20; whey drawn from curd at 12.20 p. m.; curd ground and salted at 3.40; eight pounds of salt added.

ANALYSES CONNECTED WITH FACTORY EXPERIMENT.

	COMPOSITION EXPRESSED IN PARTS PER HUNDRED.							COMPOSITION EXPRESSED IN POUNDS.					
	Per cent of water.	Per cent of total solids.	Per cent of fat.	Per cent of caseine and albumen.	Per cent of ash.	Per cent of lactic acid.	Per cent of sugar.	Pounds.	Pounds of water.	Pounds of total solids.	Pounds of fat.	Pounds of caseine and albumen.	Pounds of lactic acid.
Milk.....	85.67	64.83	84.49	25.88	1.81	0.59	...	3200	111	200.4	107.4	78.9	1.84
Whey.....	85.26	64.74	84.63	25.08	8.27	0.65	...	*3870	112	205.7	109.9	79.7	2.06
Curd.....	88.49	61.51	88.14	22.74	4.07	0.53	5.80	...	...	...	...	...	...
Cheese, three weeks.....	...	...	...	...	...	...	...	...	...	...	...	...	...
Cheese, five weeks.....	...	...	...	...	...	...	...	...	...	...	...	...	...

* Estimated.

TABULATED STATEMENT OF THE PRINCIPAL CONDITIONS OF MANUFACTURE.

NUMBER OF EXPERIMENT.	Temperature of milk at start.	Time taken to heat to 86 F.	Time from adding rennet to curdling curd.	Time taken to heat to 98 F. after cutting and stirring.		Time from reaching 98 F. to drawing whey.		Time from drawing whey to salting.		Time from salting to putting in press.		Time of salting to whole operation.	
		Min.	Min.	Hrs.	Min.	Hrs.	Min.	Hrs.	Min.	Hrs.	Min.	Hrs.	Min.
One	60	35	20	..	25	1	36	..	59	1	05	6	..
Two	65	41	20	..	45	..	55	1	40	1	15	6	21
Three	77	16	14	1	16	..	45	1	20	2	05	6	16
Four	61	35	18	..	58	1	22	2	55	..	15	7	05
Five	63	25	23	..	58	1	51	1	..	1	40	6	40
Six	61	30	20	..	55	..	85	3	..	..	10	6	10
Seven	72	25	19	..	55	1	55	..	30	1	25	9	..
Eight	65	24	19	..	55	1	35	..	35	1	55	6	02
Nine .....	.....	.....	34	1	..	2	..	3	..	..	..	..	..

In comparing some of the more important conditions of manufacture in the different experiments, we note the following among some of the interesting points:

1. The time in which the caseine was coagulated by the rennet sufficiently to cut was quite uniform in the station experiments; it averaged about nineteen minutes, in six of the departments the variation being not over one minute from this average. The home-made rennet-extract coagulated the caseine in nineteen minutes.

2. The time required to heat the curd and whey to about 98 degrees F. after cutting and stirring averaged about fifty-three minutes, in five of the experiments the variation being within five minutes of this time.

3. The time from reaching the temperature of 98 degrees F. to drawing the whey averaged about an hour and twenty-three minutes, the variation from this average being from thirty-eight minutes below to thirty-two minutes above. This portion of the operation appears to have been less under the control of the maker than the preceding conditions.

4. The time from drawing whey to stirring curd averaged in the case of the stirred-curd process about one hour, with a variation from thirty minutes below to forty minutes above. In the Cheddar process the time was about three hours, and was quite uniform.

5. The time from salting curd to putting it to press varies, in the stirred-curd process, from one hour and five minutes to two hours and five minutes, the average being one hour and thirty-four minutes. In the Cheddar process, the time was only ten or fifteen minutes.

6. The time occupied by the whole operation of cheese-making from the beginning to the end varies from six to seven hours, the average being six hours and twenty minutes. In six of the experiments the extreme variation was about twenty minutes, the average being six hours and eight minutes.

7. From an examination and comparison of the data, it appears that the time which the rennet takes to act upon the caseine is

independent of the amount of total solids, fat or nitrogen compounds.

The rapidity of action of rennet probably depends upon (1) the amount of rennet used, (2) the temperature of the milk, and (3) the degree of ripeness of the milk.

Flavor and Texture of Cheese.

When the stirred-curd cheeses were about one month old and the Cheddars were about fifteen days old, they were sampled and examined by Mr. Geo. A. Smith. Though the description is general and may not mean much to one unacquainted with cheese, it will have a fairly definite meaning for those who are accustomed to examining cheese. The numbers correspond to the experiments as already given.

1. Flavor mild, texture good, but rather dry.
2. Flavor mild, texture fine and dry.
3. Flavor perfect, texture fine.
4. Flavor good, but not acid enough for a fine shipping cheese; texture dry but loose.
5. Flavor good, texture good.
6. Flavor perfect, texture fine, close, solid.
7. Flavor perfect, fine, fine butter; texture perfect; a very fine shipping cheese, best of lot. Would be classed by shippers a fancy September cheese.
8. Flavor, very good; texture, very silky; a fine eating cheese.

Influence of Composition of Milk on Composition and Yield of Cheese.

Under this general head the following points will be discussed:

1. Amount of fat recovered and lost in making cheese.
2. Influence of fat in milk on composition of cheese.
3. Influence of fat in milk on yield of cheese.
4. Amount of caseine and albumen recovered and lost in making cheese.
5. Relation of albumen to caseine in milk.

6. Influence of caseine and albumen in milk on composition of cheese.

7. Influence of relation of fat to caseine and albumen in milk on composition of cheese.

8. Influence of caseine and albumen in milk on yield of cheese.

9. Influence of relation of fat to caseine and albumen in milk on loss of these compounds in cheese-making.

10. Yield of cheese.

AMOUNT OF FAT RECOVERED AND LOST IN MAKING CHEESE.

Method of making calculations.—In ascertaining the amount of fat lost and recovered in cheese-making, two methods may be employed. First, the amount of fat in the three wheys represents the loss, and this amount subtracted from the amount of fat in the milk represents the amount of fat recovered in the cheese. This method makes no allowance for loss of material in handling, but loss from this source is so slight as to make little difference in the results. The second method of calculating the loss of fat is to take the amount of fat found in the cheese by analysis, which is the amount recovered, and subtract this from the amount of fat in the milk; the difference represents the amount of fat lost. The results obtained by these two methods should agree, one serving as a check upon the other, if there were no source of error in the analysis of the cheese, but as previously pointed out it is extremely difficult to sample a cheese in such a way that the sample analyzed shall represent the composition of the whole cheese, unless we cut up the cheese. Consequently the results of loss and recovery of fat, as obtained by these two methods of calculation, do not agree closely as a rule.

The method adopted as giving the more satisfactory results is the first, that is taking the fat in the wheys as representing the loss. This subtracted from the fat in the milk gives the amount of fat recovered in the green cheese. The amount of fat in a marketable cheese, three to five weeks old, is, under ordinary circumstances, somewhat less than in the green cheese, but, for the purposes of comparison in regard to the loss of fat in making

cheese, the method adopted gives satisfactory results. The loss of fat in the process of ripening will be noticed later.

In the following table the amounts of fat lost and recovered are presented two ways: First, the number of pounds of fat lost and recovered in 100 pounds of milk is given. Second, the proportion of fat in milk lost and recovered is given; that is, the pounds of fat lost and recovered for 100 pounds of fat in the milk. Taking the first experiment for example, the amount of fat in milk is 2.35 pounds in 100 pounds of milk; of this amount 0.154 pounds are lost or 6.55 per cent of the whole amount of fat in the milk. That is the same as saying that if from 2.35 pounds in milk .154 pounds of fat are lost, then from 100 pounds of fat in milk 6.55 pounds would be lost. As previously stated, the balance remaining after taking out the amount lost is assumed to be the amount recovered in the green cheese.

Table showing the amount of fat lost and recovered in making cheese.

NUMBER OF EXPERI- MENT.	Pounds of fat in 100 pounds of milk.	Pounds of fat lost in 100 pounds of milk.	Pounds of fat recovered in 100 pounds of milk.	Pounds of fat lost in whey from 100 pounds of fat in milk.	Pounds of fat recovered in green cheese from 100 pounds of fat in milk.
1.....	2.35	0.154	2.196	6.55	93.45
2.....	3.01	0.193	2.817	6.42	93.58
3.....	3.88	0.277	3.603	7.15	92.85
4.....	3.96	0.283	3.677	7.14	92.86
5.....	4.70	0.359	4.341	7.64	92.36
6.....	4.73	0.331	4.399	6.99	93.01
7.....	4.80	0.373	4.427	7.77	92.23
8.....	6.49	0.715	5.775	11.01	88.89
9.....	3.70	0.269	3.431	7.26	92.74

Statement of results.

In examining the above table we notice the following points of interest:

1. The amount of fat lost in the whey increased gradually, but not uniformly, as the amount of fat in the milk increases.

If we take the fat in the first milk as unity and also the amount of fat lost as unity and arrange the succeeding numbers on this

basis, we can trace the relation between the increase of loss and the increase of fat in the milk.

NUMBER OF EXPERIMENT.	Increase of fat in milk.	Increase of loss of fat in whey.	Difference between above.
1.....	1	1	0
2.....	1.28	1.25	0.03
3.....	1.65	1.80	0.15
4.....	1.68	1.84	0.16
5.....	2.20	2.33	0.33
6.....	2.01	2.15	0.14
7.....	2.04	2.42	0.38
8.....	2.76	4.64	1.88

Calling the amount of fat in the first milk one, the amount of fat in the second is 1.28 times that in the first; the fat in the third is 1.65 times that in the first, etc. Calling the amount of loss in the second is 1.25 times that in the first; the fat in the third is 1.80 times that lost in the first, etc. If the increase of loss were uniform with the increase of fat in the milk, the two sets of numbers would be the same.

In the second experiment, both numbers would be 1.28 if the loss were uniform with the increase of fat in the milk. Instead of 1.28, the loss is 1.25, so that the increase of loss is not quite so large as the increase of fat in the milk. In the remaining experiments, the increase of loss of fat is greater in proportion than the increase of fat in the milk, the relation between the two sets of numbers tending to grow wider apart as the fat in the milk increases. Leaving out the sixth experiment, the increase in loss is relatively in excess of the increase of fat in the milk by a steadily increasing amount.

2. The average amount of fat lost in the nine experiments is 0.329 pounds in 100 pounds of milk; excluding the eighth experiment, the average loss of fat for 100 pounds of milk is 0.25 pounds for each 100 pounds of milk. If the same milk were made into butter, the loss of fat would be considerably greater than the

above, unless the best dairy appliances and highest skill were used.

3. Basing a comparison of loss of fat in the different experiments upon 100 pounds of fat in the milk, we notice that the loss is least in the second experiment, although the milk in this case contains more fat than in the first experiment.

No definite cause can be given for this apparent discrepancy. We should expect a greater proportion of loss in the second experiment. The larger proportion of loss in the first experiment was probably due to some unknown condition in some part of the process of manufacture. A similar apparent exception to the general tendency occurs in the sixth experiment, where the proportion of fat lost is less than in the fifth and seventh experiments, though the fat in the milk of these three experiments is nearly the same. The difference here may be due to the fact that, in the sixth experiment, the Cheddar process was used, while the stirred-curd process was used in the other two cases.

The increase of relative loss of fat is not great, until we get to milk containing over four pounds of fat in 100 pounds of milk; and, even in the first seven experiments, the difference of loss between the highest and lowest cases is only 1.35 pounds for 100 pounds of fat in the milk.

4. The average loss of fat in all the experiments is about 7.55 pounds of fat for every 100 pounds of fat in the milk, the average amount of fat in all the milks being 4.18 pounds of fat in 100 pounds of milk. Omitting the eighth experiment, the average number of pounds of fat per hundred pounds of milk is 3.89, while the loss of fat averages 7.1 pounds for 100 pounds of fat in milk. Taking the average of the second, third and fourth experiments, which more nearly represent average factory milk, the amount of fat in 100 pounds of milk is 3.62 and the average loss of fat is 6.9 pounds for 100 pounds of fat in milk.

5. In the comparison made between the stirred-curd and Cheddar processes, the amount of fat lost in the third and fourth experiments is practically the same, the fat in the milk being nearly the same in amount. In the fifth, sixth and seventh experiments, when the fat in the milk was about the same, being

between 4.7 and 4.8 per cent, the Cheddar process gave considerably better results. That the difference in favor of the Cheddar process in this case was due to the Cheddar process we cannot say; changes, due to other conditions in the process of manufacture, may have made the difference. Before we can draw any definite conclusions in regard to loss of fat in the Cheddar process, as compared with the stirred-curd, many other experiments will be needed.

6. As regards the use of commercial rennet-extract and the home-made rennet-extract, the fifth and seventh experiments show practically no difference as regards the amount of fat lost.

INFLUENCE OF FAT IN MILK ON COMPOSITION OF CHEESE.

It might perhaps be assumed that the amount of fat in a cheese is largely dependent upon the amount of fat in the milk from which the cheese is made. This would, of course, be modified by the amount of fat that is lost in making, also by the amount of water in the cheese, which depends upon the process of manufacture; the amount of caseine in the cheese would have also some influence.

The figures representing the pounds of fat, water, etc., in the table below, are obtained by averaging the different analyses of each cheese.

Table showing relations of fat in milk composition of cheese.

NUMBER OF EXPERIMENT.	Pounds of fat in 100 pounds of milk.	Pounds of fat in 100 pounds of cheese.	Pounds of water in 100 pounds of cheese.	Pounds of caseine in 100 pounds of cheese.
1	2.35	23.7	42.0	27.6
2	3.01	30.6	37.0	25.0
3	3.88	34.5	34.8	24.9
4	3.96	30.4	37.8	23.5
5	4.70	35.9	33.4	24.7
6	4.73	34.5	37.4	22.3
7	4.80	39.0	35.9	22.5
8	6.49	44.6	32.2	17.9
9	3.70	34.6	35.5	25.2

Statement of Results.

1. The amount of fat in a cheese tends to increase, but not uniformly, when the amount of fat in the milk increases. An examination of the above table shows that in the first, second, third, fifth, seventh and eighth experiments the above statement holds good.

If we take the amount of fat in the first milk as one, and the amount of fat in 100 pounds of cheese as one, and arrange the succeeding numbers on this basis we can trace the general relation between the increase of fat in the milk and the increase of fat in the cheese.

NO. OF EXPERIMENT.	1.	2.	3.	4.	5.	6.	7.	8.
Increase of fat in milk	1	1.28	1.65	1.68	2.00	2.01	2.04	2.75
Increase of fat in cheese	1	1.29	1.45	1.38	1.51	1.45	1.64	1.88
Difference between above.	0	0.01	0.20	0.40	0.49	0.56	0.40	0.88

Calling the amount of fat in 100 pounds of milk one, the amount of fat in the second is 1.28 times that in the first; the fat in the third is 1.65 times that in the first, etc. Calling the amount of fat in 100 pounds of cheese one, in the first experiment, the amount of fat in the second is 1.29 times that in the first; the amount of fat in 100 pounds of the third cheese is 1.45 that in the first, etc. If the increase in the fat in the cheese were uniform with the increase of fat in the milk, the two sets of numbers would be the same. In the second experiment both numbers would be 1.28, if the increase of fat in the cheese were uniform with the increase of fat in the milk. Instead of 1.28 the increase of fat in the cheese is represented by 1.29; that is the cheese contains a little more fat than we should expect, if the increase was uniform. In the other experiments, the difference is in the other direction; that is, the fat in the cheese does not increase as rapidly in proportion as does the fat in the milk, the relation between the two sets of numbers tending to grow wider apart as the fat in the milk increases.

2. In the fourth and sixth experiments, in which the Cheddar process was used, we notice that the fat in the cheese is considerably less than in the corresponding experiments, in which the stirred-curd process was employed. The Cheddar process appears to make cheese containing more water and proportionately less fat.

3. Milk containing less than three per cent of fat would, on the basis of these experiments, make a cheese containing less than thirty per cent of fat. Such a cheese would be below the standard required by law in Wisconsin.

INFLUENCE OF FAT IN MILK ON YIELD OF CHEESE.

In the following table, the amount of cheese made from 100 pounds of milk is calculated as cheese five weeks old. The figures under "Pounds of fat in cheese from 100 pounds of milk" are based upon the average of all the analyses of each cheese.

Table showing relation of fat in milk to yield of cheese.

NUMBER OF EXPERIMENT.	Pounds of marketable cheese made from 100 pounds of milk.	Pounds of fat in 100 pounds of milk.	Pounds of fat in cheese from 100 pounds of milk.	Pounds of caseine, water, etc., in cheese from 100 pounds of milk.
1	9.05	2.35	2.20	6.85
2	8.86	3.01	2.73	6.13
3	10.11	3.88	3.56	6.55
4	11.25	3.96	3.56	7.69
5	11.07	4.70	4.04	7.03
6	12.12	4.73	4.33	7.79
7	11.12	4.80	4.47	6.65
8	12.52	6.49	5.73	6.79

Statement of Results.

1. In the experiments described in this bulletin the increase in the yield of cheese was due to increase of fat in milk more than to any other constituent of the milk.

In the foregoing table it is noticeable that the yield of cheese increases, in most cases, when the fat in the milk increases. Is this increase of yield in cheese due alone to increase of fat in

milk? We can answer this question more clearly by rearranging the data presented in the above table in the following manner:

NUMBER OF EXPERIMENT.	YIELD OF CHEESE FROM 100 POUNDS OF MILK.		POUNDS OF FAT IN CHEESE FROM 100 POUNDS OF MILK.	POUNDS OF CASEINE, WATER, ETC., IN CHEESE FROM 100 POUNDS OF MILK.	
	Increase of yield	Decrease of yield.	Increase of fat in cheese.	Incr. ase.	Decrease.
1.....	.....	.....	.....	.....	.....
2.....	.....	0.19	0.53	.....	0.72
3.....	1.06	.....	1.36	.....	0.30
4.....	2.20	.....	1.36	0.84	.....
5.....	2.02	.....	1.84	0.18	.....
6.....	3.07	.....	2.13	0.94	.....
7.....	2.07	.....	2.27	.....	0.20
8.....	3.47	.....	3.53	.....	0.06

The yield of cheese in the first experiment is taken as a starting point, and is compared with each following experiment; where the yield is greater than in the first cheese the difference or increase is placed in the second column; where there is a less yield than in the first case, the difference or decrease is placed in the third column. Thus, in the second experiment, the yield was 0.19 pounds less than in the first; in the third the yield was 1.06 pounds greater than in the first; in the fourth the yield of cheese was 2.20 pounds greater than in the first, etc. The next column gives the increase of fat in the cheese. Thus, the second cheese contained .53 pounds fat more than the first; the third, 1.36 pounds fat more than the first, etc. The last two columns show the difference of decrease and increase in amount of caseine, water, etc., of the various cheeses as compared with the first. Thus, the second, third, seventh and eighth cheeses contain a smaller amount of caseine, water, etc., than the first cheese, while the fourth, fifth and sixth cheeses contain more caseine, water, etc., than the first.

Comparing the first and second experiments we see that the yield of cheese diminished .19 pounds, while the fat increased .53 pounds. Then, we see that the caseine, water, etc., decreased .72

pounds, so that the loss in yield was due to an excessive loss of caseine, water, etc., the increase of fat being insufficient to overcome the large loss of water, caseine, etc.; hence, there was a decrease in yield.

Comparing the first and third experiments, the yield of cheese increased 1.06 pounds, while the fat increased 1.36 pounds and the other constituents decreased 0.30 pounds. Hence, in this case, the increased yield was entirely due to the increase of fat. The same is true in the seventh and eighth experiments as compared with the first. There was an actual decrease of the constituents not fat, so that, whatever increase there was, was due to increase of fat. In the fourth, fifth and sixth experiments the increased yield of cheese was due to the increase of both fat and of other constituents, but the greatest part of the increase was due to increase of fat.

As already pointed out, the increase of fat in the cheese is due to increase of fat in the milk; hence, the increase of yield of cheese, which has just been shown to be largely dependent upon increase of fat in the cheese, is largely dependent upon an increase of fat in milk.

It will be noticed that, in the fourth and sixth experiments in which the Cheddar process was used, the increase of yield was more largely due to increase in yield of constituents not fat than in any other case. To what extent this increase is due to caseine, we will notice later.

AMOUNT OF CASEINE AND ALBUMEN RECOVERED AND LOST IN MAKING CHEESE.

It has already been stated that caseine is coagulated by rennet and albumen is not. In cheese-making, it is probable that some of the caseine is lost in the whey, while some of the albumen is retained mechanically in the cheese in the same way that water is retained. So, in the cheese, we have most of the caseine and a small portion of albumen, while in the whey, we have most of the albumen and a small portion of the caseine. Future experiments will be made to determine the amount of caseine and albumen separately in the whey. The presence of albumen in green cheese

to the extent of one or two per cent was indicated by analysis as will be noticed later.

In the table presented below, the figures representing the amount of caseine recovered in the green cheese and lost in the whey are obtained in the manner already explained in connection with the loss and recovery of fat.

Table showing amount of caseine and albumen recovered and lost in making cheese.

NUMBER OF EXPERIMENT.	Pounds of caseine and albumen in 100 pounds of milk.	Pounds of caseine and albumen recovered in 100 pounds of milk.	Pounds of caseine and albumen lost in 100 pounds of milk.	Pounds of caseine and albumen lost in whey from 100 pounds of caseine and albumen in milk.	Pounds of caseine and albumen recovered in cheese from 100 pounds of caseine and albumen in milk.
1.....	3.34	2.63	0.71	21.17	78.83
2.....	2.81	2.31	0.50	17.91	82.09
3.....	3.45	2.52	0.93	27.06	72.94
4.....	3.81	2.89	0.92	24.18	75.82
5.....	3.91	2.86	1.05	26.78	73.22
6.....	3.53	2.90	0.63	17.93	82.07
7.....	3.24	2.43	0.81	24.97	75.03
8.....	3.37	2.56	0.81	24.00	76.00

Statement of Results.

1. The proportion of caseine and albumen lost or recovered appears to bear no definite or fixed relation to the total amount of caseine and albumen in the milk. In the first and eighth experiments the amount of caseine and albumen in the milk is practically the same, but there is a difference of nearly three per cent in the amount lost or recovered. In the third and sixth experiments the caseine and albumen in the milk is nearly the same in amount, while the difference in the amount lost or recovered is over nine per cent.

2. The average per cent of caseine and albumen in the milk in all the experiments is 3.43; the proportion of this amount that was lost averages twenty-three per cent or twenty-three pounds for every hundred pounds of caseine and albumen in the milk.

3. The use of commercial rennet-extract and home-made extract appears to show no difference as regards the amount of caseine and albumen lost or recovered.

4. The variations shown in the proportion of caseine and albumen lost and recovered are probably to be attributed to variation in details of manufacture.

RELATION OF ALBUMEN TO CASEINE IN MILK.

If we assume that the albumen is represented by the loss of nitrogen compounds, then it would appear that the relation of albumen to caseine varies considerably. Blyth, an English authority, says: "The amount of albumen in milk is really fairly constant and averages 0.7 per cent. In healthy cows it is a very constant quality. According to the author's experience, the albumen preserves a very constant relation to the caseine, the quantity of the latter being five times that of the albumen, so that if either the amount of caseine or albumen is known the one may be calculated from the other with great accuracy." The foregoing statement has been quite generally accepted as true. However, from an examination of a large number of analyses of normal milk, reported by various men, where caseine and albumen were determined separately, there appears to be considerable variation instead of uniformity. Some cases are reported where there was only one part of albumen to ten of caseine, while at the other extreme, there was one part of albumen to three of caseine, while the average of a large number was one of albumen to six of caseine.

If the loss in the above table represents albumen, then we have this compound varying from below eighteen per cent to over twenty-seven per cent of the nitrogen compounds; or, stated in another way, there is for the lowest one part of albumen to 2.7 parts of caseine, and for the highest number one part of albumen to 4.6 parts of caseine; in all the average is one part of albumen to 3.5 parts of caseine. If the relation were as Blyth states, one part of albumen to five of caseine, then the loss in every hundred pounds of caseine and albumen in milk would be less than seventeen pounds, while in these experiments the least loss is nearly

eighteen pounds and the greatest over twenty-seven pounds. This can be explained by assuming that a definite amount of albumen, say seventeen pounds, was lost, and that the variation from eighteen to twenty-seven pounds was caused by an additional loss of caseine, varying in the different experiments.

While these results are merely suggestive in regard to the relation of caseine and albumen in milk it is evident that here is a field for investigation in the future. It is probably not sufficiently correct to assume that all the loss is albumen, but doubtless some of the caseine and most of the albumen go into the whey, while most of the caseine and some of the albumen go into the cheese; the amount of caseine lost probably depends upon variation in the details of cheese-making.

In this connection it may be stated that efforts have been made to recover the albumen in the cheese. Doubtless most of the albumen can be recovered, but it remains to be seen what effect its presence in considerable quantities may have upon the keeping and other qualities of the cheese.

INFLUENCE OF CASEINE AND ALBUMEN IN MILK ON COMPOSITION OF CHEESE.

The figures in the last two columns of the table below are obtained by averaging the different analyses of each cheese.

Table showing the amount of caseine and albumen in milk and in cheese.

NUMBER OF EXPERIMENT.	Pounds of caseine and albumen in 100 pounds of milk.	Pounds of caseine and albumen in cheese from 100 pounds of milk.	Pounds of caseine and albumen in 100 pounds of cheese.
1	3.34	2.56	27.6
2	2.81	2.27	25.0
3	3.45	2.57	24.9
4	3.81	2.75	23.5
5	3.91	2.78	24.7
6	3.53	2.80	22.7
7	3.24	2.58	22.5
8	3.37	2.29	17.9

Statement of Results.

A study of the data in the above table does not reveal any direct or uniform relation between the amount of caseine and albumen in milk and the proportion of caseine and albumen in 100 parts of cheese. The amount of caseine and albumen in the milk is fairly constant, varying only a little over one pound per 100 pounds of milk in all the experiments, from 2.81 to 3.91; and the actual number of pounds of caseine and albumen in cheese made from 100 pounds of milk varies only from 2.27 to 2.80 pounds, a little over one-half of a pound. But we see that the proportion of caseine and albumen in 100 pounds of cheese varies from 27.6 pounds in the first to 17.9 in the last experiment, a variation of nearly ten pounds. We can, therefore, perceive no relation between the composition of the milk and the composition of the cheese in respect of caseine and albumen, if we consider these constituents by themselves. Since we have already seen how preponderating an influence the fat in the milk exercises on the composition of the cheese, we must study the influence of caseine and albumen in milk on the composition of cheese in connection with the fat in the milk and in the cheese.

INFLUENCE OF RELATION OF FAT TO CASEINE AND ALBUMEN IN
MILK ON COMPOSITION OF CHEESE.

Rearranging data already presented in previous tables we have the following table:

NUMBER OF EXPERIMENT.	Pounds of caseine and albumen in cheese from 100 pounds of milk.	Pounds of fat in cheese from 100 pounds of milk.	Pounds of caseine and albumen in 100 pounds of cheese.	Pounds of fat in 100 pounds of cheese.	Pounds of fat for one pound of caseine and albumen in milk.
1.	2.56	2.20	27.6	23.7	0.79
2.	2.27	2.73	25.0	30.6	1.07
3.	2.57	3.56	24.9	34.5	1.12
4.	2.75	3.56	23.5	30.4	1.04
5.	2.78	4.04	24.7	35.9	1.20
6.	2.80	4.33	22.7	34.5	1.34
7.	2.58	4.47	22.5	39.0	1.48
8.	2.29	5.73	17.9	44.6	1.92

In examining the above table, we notice the following facts:

1. The pounds of caseine and albumen in the cheese from 100 pounds of milk is fairly constant, varying only about one-half of a pound in all the experiments.

2. The pounds of fat in the cheese from 100 pounds of milk constantly increases from the first to the last experiment, increasing from 2.20 to 5.73 pounds, a variation of over 3.5 pounds.

3. Since the amount of fat constantly increases, and the amount of caseine and albumen remains nearly the same, there will be in the different cheeses less caseine and albumen in proportion to the fat, that is, the amount of caseine in 100 pounds of cheese will decrease relatively as the amount of fat increases. This is clearly indicated in the fourth and fifth columns of the above table.

4. The proportion of caseine and albumen in cheese depends upon the amount of caseine and albumen, relative to the amount of fat in the milk, and not upon the amount of caseine and albumen taken alone. Thus, in the first experiment, the amount of caseine and albumen in the milk is 3.34 pounds per hundred, while the fat is only 2.35 pounds in amount; that is, for one pound of caseine and albumen in the milk is 3.34 pounds per hundred, while the from this milk we find the amount of caseine highest of all. In the eighth experiment, the amount of caseine and albumen is about the same as in the first case; the amount of fat, however, is nearly twice as much, and in the cheese made from this milk we find the amount of caseine and albumen least. A comparison of the fourth and last columns in the above table shows clearly that as the amount of fat in the milk increases relative to the caseine and albumen, the proportion of caseine and albumen in the cheese diminishes.

While we can say, roughly, what per cent of fat cheese will contain, if we know the per cent of fat in normal milk, we cannot tell at all what per cent of caseine and albumen cheese will contain from knowing only the per cent of these constituents in the milk.

5. Attention is called to the fact that the highest amount of caseine in any cheese is 27.6 pounds per hundred, and this was made from milk containing a proportion of ten pounds of caseine

and albumen to seven pounds of fat, a large excess of caseine and albumen, which would not be found often in normal milk. It is often stated that good cheese should consist of about one-third water, one-third fat and one-third caseine. If this statement be true, the inquiry is pertinent here, what kind of milk would be required to make cheese consisting of one-third caseine, when milk containing less than 2.5 per cent of fat, with an excess of caseine and albumen, makes cheese containing less than twenty-eight per cent of caseine ?

The influence of caseine and albumen in milk on yield of cheese.

NUMBER OF EXPERIMENT.	Pounds of market- able cheese made from 100 pounds of milk.	Pounds of caseine and albumen in 100 pounds of milk.	Pounds of caseine and albumen in cheese from 100 pounds of milk.	Pounds of fat in cheese from 100 pounds of milk.	Pounds of water, salt, etc., in che- se from 100 pounds of milk.
1.....	9.05	3.34	2.56	2.20	4.29
2.....	8.86	2.81	2.27	2.73	3.86
3.....	10.11	3.45	2.57	3.66	3.98
4.....	11.25	3.81	2.75	3.56	4.94
5.....	11.07	3.91	2.78	4.04	4.25
6.....	12.12	3.53	2.80	4.33	4.99
7.....	11.12	3.24	2.58	4.47	4.07
8.....	12.52	3.37	2.29	5.73	4.50

1. The influence of the caseine and albumen in the milk upon increase or decrease in yield of cheese is slight as compared with the influence of the fat.

While the above table does not show most clearly the truth of the foregoing statement, we can, by rearranging the data, present them in such a way as to show the fact stated.

Number of experiment.	YIELD OF CHEESE FROM 100 POUNDS OF MILK.		POUNDS OF CASEINE IN CHEESE FROM 100 POUNDS OF MILK.		Pounds of fat in cheese from 100 pounds of milk. Increase of fat in cheese.	POUNDS OF WATER, ASB. ETC., IN CHEESE, FROM 100 POUNDS OF MILK.	
	Increase of yield.	Decrease of yield.	Increase of caseine in cheese.	Decrease of caseine in cheese.		Increase of water, etc., in cheese.	Decrease of water, etc., in cheese.
1	.....	.....	.....	.....	.....	.....	.....
2	.....	0.19	.....	0.29	0.53	.....	0.43
3	1.06	.....	0.01	.....	1.36	.....	0.31
4	2.20	.....	0.19	.....	1.36	0.65	.....
5	2.02	.....	0.22	.....	1.84	.....	0.04
6	3.07	.....	0.24	.....	2.13	0.70	.....
7	2.07	.....	0.02	.....	2.27	.....	0.22
8	3.47	.....	.....	0.27	3.53	0.21	.....

In the foregoing table, the yield of cheese in the first experiment is taken as a starting point, and is compared with the yield in each of the following experiments; where the yield is greater than in the first cheese, the difference or increase is placed in the second column; where there is a yield less than in the first case, the difference or decrease is placed in the next column. Thus in the second experiment the yield of cheese was 0.19 pounds less than in the first; in the third the yield was 1.06 pounds greater than in the first; in the fourth case the yield was 2.20 pounds greater than in the first case, etc. The fourth and fifth columns in a similar manner, give the amount of increase or decrease of caseine and albumen in each cheese as compared with the first. Thus, the second and eighth cheeses contained less, while the others contained more caseine and albumen than the first cheese. The sixth column gives the increase of fat in each cheese over the fat in the first cheese. The last two columns give, in a similar manner, the increase and decrease of the remaining constituents of the cheese, chief of which is water; the second, third, fifth and seventh cheeses contain less water, etc., than the first cheese, while the other cheeses contain more.

Comparing the first and second experiments we see that the yield of cheese was diminished 0.19 pounds. The loss of yield

was caused by a decrease of 0.29 pounds of caseine and albumen and 0.43 pounds water, etc. The fat increased 0.53 pounds but the loss of the other constituents was 0.19 pounds greater than this gain of fat.

If the caseine had remained the same as in the first experiment, there would have been a slight increase in the yield of cheese. The decrease in the amount of caseine was due to the fact that the milk contained about one-half a pound less of caseine and albumen than in the first experiment. Though the decrease in caseine and albumen here is considerable, it does not exercise so great an influence on the diminished yield of cheese as does the decrease of water.

Comparing the first and third experiments, the yield of cheese increased 1.06 pounds. Of this amount of increase, we can credit it only .01 pounds to the caseine and albumen, the rest being due to increase of fat; there was a decrease of water, etc.

If, in a similar manner, we compare each of the succeeding experiments with the first we see, first, that the increase or decrease in yield of cheese is in every case dependent very much less upon the caseine and albumen than upon the fat; and, second, that the amount of water exercises a greater influence on increase or decrease of yield of cheese than do the caseine and albumen.

2. It will be noticed that in the fourth and sixth experiments in which the Cheddar process was employed, there was an increased yield of cheese, due, more largely than in other cases, to the increase of caseine, albumen and water retained in the cheese.

Influence of relation of fat to caseine and albumen in milk on loss of these compounds in cheese-making.

NUMBER OF EXPERIMENT.	Pounds of fat for one pound of caseine and albumen in the milks used.	Pounds of fat lost in whey from 100 pounds of fat in milk.	Pounds of caseine and albumen lost in whey from 100 pounds of caseine and albumen in milk.
1.....	0.70	6.55	21.17
2.....	1.07	7.42	17.91
3.....	1.12	7.15	27.06
4.....	1.04	7.14	24.18
5.....	1.20	7.64	26.78
6.....	1.34	6.99	17.93
7.....	1.48	7.77	24.97
8.....	1.92	11.01	24.00

1. An examination of the above table indicates, in a general way, that where the fat in the milk is large in amount, as compared with the caseine and albumen, the loss of fat in the whey is greater than where the fat and caseine in the milk are more nearly alike.

Thus, in the first experiment, there is more caseine and albumen than fat in the milk and the loss of fat is 6.55 per cent. The second experiment is exceptional to the general statement, also the fourth and sixth experiments. The seventh and eighth show the tendency in a quite marked degree. The lack of uniformity in the results may be accounted for by variations in the details of manufacture, independent of the relation of the fat to the caseine and albumen in the milk.

We should expect such a tendency, for when the proportion of caseine and albumen is larger, more fat will be held in the curd and less lost in the whey, provided the treatment in manufacture is the same.

The loss of fat would not have been so large in the milks that contained the higher percentage of fat, had those milks been normal. Thus, in a normal milk containing 6.49 per cent of fat, there would be about 1.44 pounds of fat to one pound of caseine

and albumen; but in the milk used, there were nearly two pounds of fat to one of caseine and albumen. As already stated, the amount of caseine and albumen in the different milks was fairly constant, while the fat varied greatly, and the caseine was, in the extreme cases insufficient to hold the fat as completely as in the other cases.

2. The relation of fat to caseine and albumen in milk does not appear to be in any way connected with the amount of caseine and albumen lost. In the second and sixth experiments the loss of albumen and caseine is the same, but there is in the latter case much more fat for the same amount of caseine and albumen.

Amount of Milk Required to Make One Pound of Cheese.

The accompanying table states the amount of milk required to make a pound of cheese, taking each cheese when it is green, and then when it is one, three and five weeks old. As a cheese loses weight from week to week, the amount of milk equivalent to one pound of the same cheese, as it becomes older and lighter, must become proportionately greater. Probably the figures under the fifth week after manufacture more nearly represent the condition of the cheese when it becomes marketable. The figures are based upon the actual weights of the cheese, no allowance being made for variation in the amount of water in the cheese. As will be noticed later, the loss of weight in the different cheeses is not quite uniform.

Table showing pounds of milk required to make one pound of cheese.

NUMBER OF EXPERIMENT.	When cheese was green.	When cheese was one week old.	When cheese was three weeks old.	When cheese was five weeks old.
1	10.23	10.50	10.79	11.05
2	10.34	10.71	10.01	11.29
3	9.15	9.48	9.69	9.89
4	8.19	8.42	8.70	8.89
5	8.44	8.73	8.90	9.03
6	7.64	7.85	8.08	8.25
7	8.16	8.38	8.76	8.99
8	7.28	7.54	7.81	7.99

From what has gone before, we can account for the changes in the amount of milk required to make one pound of cheese.

1. As a rule, less milk was required for one pound of cheese when the amount of fat in the milk increased.

In the second experiment more milk is required than in the first, although the fat is greater in the second case. This, we have seen is due to two facts (first), that the second milk contained less caseine and albumen; and (second), that the cheese in the second case retained a smaller proportion of water.

2. As between the third and fourth experiments, the fourth cheese made by the Cheddar process required less milk for a pound of cheese, because the resulting cheese contained a larger proportion of water; the fat recovered being the same in both experiments. In the sixth experiment where the Cheddar process was also employed, the loss of fat was less, and also the cheese retained more water than in the case of the stirred-curd cheeses, made in experiments five and seven from milk containing approximately the same amount of fat.

Results of Experiments Applied to Practical Dairy Problems.

Under this head we shall treat, in a more or less general way, the following subjects:

1. The common method of paying for milk at cheese factories.
2. The method of paying for milk according to the amount of fat contained in it.
3. Manufacture of whole-milk cheese and skim-milk cheese.
4. Remedy for the chief defect in the present method of judging cheese in open market.
5. Cheese-making and butter-making.

The common method of paying for milk at cheese factories.

We will suppose that eight men take milk to a cheese factory, each man furnishing 100 pounds of milk varying in composition according to the milk used in the series of experiments described in this bulletin; that is, the first man's milk is like that used in

the first experiment, the second one's like that used in the second experiment, etc. We will suppose that these milks mixed together make the same amount of cheese as when they are separate, though as a matter of fact they would probably produce a little more cheese when mixed. As seen in the table below, the amount of marketable cheese made from these milks, 100 pounds of each, is 86.1 pounds. Suppose the cheese sells for 9.85 cents per pound, that is equivalent to twenty-five cents for each pound of fat in the milk; the present market price of cheese would probably justify a higher price. The amount of money received for the 86.4 pounds of cheese at 9.85 cents per pound would be eight dollars and forty-eight cents. There are eight men to share it equally, as each contributed the same amount of milk, hence the share of each would be about one dollar and six cents.

The method of paying for milk at cheese factories according to the amount of fat in the milk.

First method. We will suppose that the same amount of milk is contributed by each man and that the same amount of cheese is made as in the foregoing instance. We will suppose, as before, that the cheese sells for 9.85 cent per pound, giving as total for the whole amount of cheese eight dollars and forty-eight cents. The entire amount of fat in all the milk is 33.92 pounds. That would make each pound of fat in the milk worth twenty-five cents per pound. Then, by multiplying the pounds of fat contained in the milk contributed by each man, we obtain the amount of money due each, which is shown in the table below.

Second method. Another way would be to find how much cheese one pound of fat in the milk will make: The milks mixed together make 86.1 pounds of cheese from 33.92 pounds of fat. By dividing the amount of cheese by the amount of fat in the milk we get the amount of cheese which one pound of fat in the milk actually makes. In this case there are 2.54 pounds of cheese for each pound of fat in the milk. Now, if we multiply the amount of fat in each milk by 2.54, we find how much cheese is made. This amount of cheese, multiplied by the selling price per pound, will

give the same numbers as those obtained by the preceding method.

Table illustrating methods of paying for milk at cheese factories.

NUMBER OF EXPERIMENT.	Pounds of market-able cheese from 100 pounds of milk.	Pounds of fat in 100 pounds of milk.	Value of 100 pounds of milk paid for by common methods.*	Value of 100 pounds of milk paid for according to amount of fat in milk.*
1	9.05	2.35	\$1 06	\$0 59
2	8.86	3.01	1 06	0 75
3	10.11	3.88	1 06	0 97
4	11.25	3.96	1 06	0 99
5	11.07	4.70	1 06	1 17
6	12.12	4.73	1 06	1 18
7	11.12	4.80	1 06	1 20
8	12.52	6.49	1 06	1 62

In any ordinary cheese factory the difference in the amount of fat in the milk would, of course, be very much less. Most factory milks in this State probably average between three and four per cent in fat. It is probable that, in actual cheese-factory practice, the best milk, paid for on the basis of its fat, would bring about twenty-five cents more per hundred than the milk containing the least fat.

Manufacture of whole-milk cheese and skim-milk cheese.

Which pays better, the manufacture of skim-milk cheese and butter or the manufacture of whole-milk cheese? This question is far from being a new one, but it may be of interest to try to answer the question in connection with these experiments. While our data are not extended enough to be of practical use in this connection, they may serve as a guide for general discussion.

Among the points that must be considered in discussing this question are the following: (1st) Does milk, poor in fat, make

* Calculated on the basis of fat in milk at twenty-five cents per pound, or cheese at an average of 9.85 cents per pound.

more or less cheese in proportion to its per cent of fat than milk richer in fat? (2d) Does cheese made from milk, poor in fat, sell for a greater or less price in proportion to the fat in the milk than cheese made from milk richer in fat? (3d) Do the butter and skim-cheese made from the same milk bring, together, a larger price than would the cheese made from the same milk unskimmed? (4th) What is likely to be the ultimate effect of manufacturing skim-cheese upon the consumption of cheese?

1. Pounds of cheese for each pound of fat in the milk.

NUMBER OF EXPERIMENT.	Pounds of cheese for one pound of fat in the milk.	Pounds of fat in 100 pounds of milk.
1	3.85	2.35
2	2.94	3.01
3	2.60	3.88
4	2.84	3.96
5	2.35	4.70
6	2.56	4.73
7	2.32	4.80
8	1.93	6.49

An examination of these figures indicates that a pound of fat in a milk poor in fat will, as a rule, make more cheese than will a pound of fat in richer milk. This would be expected, because the poorer milk contains larger proportions of caseine relative to the fat than the richer ones, and, moreover, cheese rich in caseine tends to take up more water than cheese rich in fat, conditions of manufacture being the same. Hence, cheese made from skim-milk contains caseine and water in large proportions and fat in relatively small proportions. This would, of course, affect the quality of the cheese. This point would bring us to the second question.

2. Does cheese made from milk, poor in fat, sell for a greater or less price in proportion to the fat in the milk than cheese made from milk richer in fat?

In the arrangement given below are indicated the prices per

pound each cheese would have to sell for in order to realize twenty-five cents per pound for each pound of fat in milk. These figures are based upon the amount of cheese made from each milk separately.

NUMBER OF EXPERIMENT.	Pounds of marketable cheese from 100 pounds of milk.	Pounds of fat in 100 pounds of milk.	Price in cents per pound of cheese on basis of milk fat at twenty-five cents per pound.
1	9.05	2.35	6.5
2	8.06	3.01	8.5
3	10.11	3.88	9.6
4	11.25	3.96	8.8
5	11.07	4.70	10.6
6	12.12	4.73	9.8
7	11.12	4.80	10.8

It is probable that the first cheese would sell in the open market for a little more than 6.5 cents and for a little less than the second cheese, while the others would probably sell for ten or eleven cents at present prices. This, of course, presupposes that the cheeses are all equally well made. The eighth cheese would not be likely to bring thirteen cents in open market, though it would doubtless bring more than this in some special market. While we cannot say definitely what each cheese would sell for in the open market, it is probable that the first cheese and, perhaps, the second cheese, would realize more than twenty-five cents a pound for each pound of milk-fat; that the other cheeses would sell for a nearly uniform price, so that cheese made from milk containing over four per cent of fat would not realize twenty-five cents per pound for the milk-fat, and might fall short of this. To settle this point definitely, these cheeses should have been sent to one or more market points to be examined by experts when of marketable age, but it was not feasible, as the cheeses were to be used for study of the ripening process.

Perhaps the most that we can be warranted in saying is that it would probably not pay to work up into cheese, for the general market, milk containing much over four per cent of fat. There are probably very few cheese factories in the State that are in any serious danger of getting milk that averages over four per cent of fat for the season.

3. Does the manufacture of cheese from ordinary factory milk pay better than the manufacture of skim-cheese and butter? Much the same question is involved as in the preceding instances. To answer the question we need to know (1st) how much butter and skim-cheese can be made from a certain quantity of milk; (2d) how much cheese can be made from the same quality of the same milk, and (3d) what would be the market value of these products in each case.

In the case of a milk containing five per cent or more of fat doubtless one-fifth of the fat could be removed, made into butter, and the remaining milk made into cheese that would sell per pound in open market for as much as the cheese made from the whole-milk. If the price of butter were not very low compared with the price of cheese, the value of the fat in the butter would be greater than if made into cheese, since the cheese-making power of a pound of milk fat tends to diminish quite rapidly when the amount of fat goes beyond that of average milk, and in addition, the open market would, probably, in most cases, recognize no difference between cheese made from milk containing four per cent of fat and that containing five per cent.

To discuss the question in a more specific manner, we will take an illustration based on these experiments.

Suppose average factory milk contains about 3.5 pounds of fat in 100 pounds of milk. If made into cheese, each pound of fat would make, on an average, about 2.75 pounds of cheese, and 100 pounds of milk would make about 9.6 pounds of cheese. To realize twenty-five cents per pound for milk fat this cheese would have to sell for about 9.1 cents per pound.

Suppose now one pound of fat is removed from the milk and made into butter. Then from each hundred pounds of milk we

should make about 1.1 pounds of butter and not more than 7.5 pounds of cheese, since taking one pound of fat from such milk would reduce the cheese-making power of the remaining milk not less than two pounds and might considerably more. To realize twenty-five cents for each pound of milk fat the butter and cheese would have to sell for 87.4 cents; or the butter would have to sell for 22.7 cents per pound and the cheese for 8.6 cents per pound, and it is safe to presume that the cheese would not sell for any such price if the whole-milk cheese sells for 9.1 cents per pound, but that the butter and cheese together would sell for considerably less than the whole-milk cheese. The additional fat in the whole-milk cheese adds to the quality of the cheese more than enough to compensate for the diminished comparative yield.

In making the above estimates, the error, if any, has been made in favor of the skim-cheese. It is, therefore, probably true that, under usual conditions, ordinary cheese-factory milk will yield a larger money return if made into cheese than if made into butter and skim-cheese. To demonstrate the point beyond all doubt we need more extensive data.

4. The ultimate effect of the manufacture of skim-cheese upon the general consumption of cheese. Here we venture somewhat into the realm of the speculative. But, granting that more money can be gotten out of milk when made into butter and skim-milk cheese than when made into whole-milk cheese, does the manufacture of skim-milk cheese increase the aggregate consumption of cheese? There may be exceptional cases where persons prefer skim-milk cheese, but it is probably true that most people would prefer whole-milk cheese if they were taught to know the difference once. The entire annihilation of the manufacture of skim-cheese and the simultaneous improvement of the manufacture of whole-milk cheese would have a tendency to increase the aggregate consumption of cheese and make better prices. If skim-milk cheese must be made it should go into the market branded as such in order that those who prefer skim-cheese may not run the risk of getting what they do not want; and likewise those who do not want skim-milk cheese. The invariable effect of putting poor

cheap products upon the market is to discourage ultimately the production of the better grades of the same kind of products.

Improvement of quality in any product is followed by increased demand at relatively better prices.

Remedy for the chief defect in the present method of judging cheese in open market.

If the experiments described in this bulletin suggest any thing at all, they indicate that the fat in the milk is the most potent factor in determining the yield and quality of cheese, and that the quality of cheese is largely affected by the amount of fat contained in it. In the present method of judging cheese only such general qualities, not always any too definite, as texture, flavor, etc., are used in determining the value of a cheese. How widely two experts may differ is well known. The factor of greatest importance—the amount of fat in cheese—is completely ignored. We cannot expect to receive pay for cheese according to its value until the amount of fat is taken into consideration in addition to the other points. The desirability of considering this point in judging cheese is too evident to need any discussion.

Cheese-making and butter-making.

Which pays better, to make milk into butter or cheese? The answer depends upon various conditions, such as (1st) the relative prices of cheese and butter, (2d) the amount of loss in the two kinds of manufacture, the amount and quality of the manufactured product, etc.

1. In winter, butter-making pays better, since the amount of fresh butter is far below the demand, and prices are comparatively high. In summer, cheese-making pays better, since the price of butter is then lowest, and in the form of cheese the product can be held and stored until prices are high.

2. As regards the loss of fat in cheese-making and butter-making, we may put the average cheese factory loss of fat at not less than seven pounds of fat for each 100 pounds of milk fat; this may not be high enough, as we have few data to base the opinion on. This would be equivalent to a loss of one pound of

fat for a little over 400 pounds of milk, or about one quarter of a pound of fat for 100 pounds of milk. In the case of butter-making from the same milk, by ordinary processes of creaming by gravity-setting, of churning, etc., as in the case of the average farmer, the loss would be not far from half a pound of fat for every 100 pounds of milk. By using a centrifugal machine for separating the cream, and by skillful handling in subsequent operations, the loss of fat can be reduced to less than six pounds of fat for each 100 pounds of milk fat, which would, in case of milk containing 3.5 per cent of fat, be equivalent to a loss of one pound of fat for 500 pounds of milk or one-fifth of a pound of fat for 100 pounds of milk.

As to yield of cheese and butter, the average yield of cheese on the above supposition would be about ten pounds of cheese for 100 pounds of milk. In the case of butter, as made by the average farmer, the amount of butter made from 100 pounds of milk would be about 3.5 pounds. In the best creameries the yield would be not less than 3.9 pounds per 100 pounds of milk.

To realize twenty-five cents a pound on each pound of milk fat, the cheese would have to sell at 8.75 cents per pound, the butter for 25 to 22.5, according to the amount lost in making.

A Study of the Process of Ripening Cheese.

Chemical changes of the ripening process.

The chemical changes that take place in the process of ripening of cheese are not very well understood in detail. According to Blyth they are somewhat as follows:

First. There is a continuous loss of water.

Second. There is a slow development of carbon dioxide, resulting from the decomposition of caseine or fat, or both.

Third. The glycerides of fat decompose, setting free the fatty acids, especially the volatile fatty acids.

Fourth. The nitrogen compounds, chief of which is caseine, gradually decompose, the nitrogen taking the form of ammonia. Hence old cheese has an alkaline reaction, while fresh cheese is acid.

Fifth. The ammonia thus formed unites with the fatty acids that have been set free, and forms ammonium salts of these acids, as ammonium butyrate, ammonium caproate, etc. Also calcium salts of these acids are formed.

Sixth. The caseine, so far as it is not decomposed, slowly passes into a soluble condition.

Cause of chemical changes in the ripening of cheese.

The chemical changes that take place when cheese ripens are due to the action of bacteria. These bacteria get into the cheese by way of the milk, and they get into the milk from the air, the bodies of cows, the hands of milkers and all unclean utensils used in storing the milk, in fact, they may come from any thing and everything with which the milk chances to come into contact from the time it leaves the cow's udder up to the time it is put into the cheese press. The nitrogen-compounds of the cheese, as well as the other constituents, furnish an extremely favorable medium for the development of bacteria, other conditions being favorable.

The bacteria in some way cause the caseine, the albumen, the fat and the sugar to undergo certain changes producing new chemical compounds, and these new chemical compounds give to the cheese the characteristic taste due to what we call ripening. If the bacteria act more rapidly or for a longer period of time, these products of bacterial action become greater in quantity and the cheese acquires a stronger flavor.

Different bacteria produce different changes and even the same kind of bacteria, under different conditions, are believed to produce different changes. Hence, in the ripening of cheese, we have different results produced, according as certain kinds of bacteria develop more abundantly. Certain bacteria, whether one particular kind or more we cannot yet say positively, produce the flavor which the market demands and which may be said to be the result of the natural ripening process. Either these same bacteria under other conditions or other bacteria under conditions suited best to their development often give rise to products that are offensive and that render the cheese worthless. In the present method of ripening cheese, the process is difficult to control,

because we do not, at the outset, know what kinds of bacteria we have to deal with in our cheese. It is not improbable that in the near future we shall greatly modify our methods of cheese-making by sterilizing the milk to start with, that is, by destroying all the bacteria that chance to be in the milk, and then adding in pure form, those bacteria that have been found to produce the desired effect. This method has already been employed in the ripening of cream for butter-making and the desirable bacteria in pure form, have already been or soon will be placed upon the market.

In connection with the chemical changes of the ripening of cheese the following points will be noticed briefly:

1. Total loss of weight in ripening.
2. Influence of ripening on fat.
3. Influence of ripening on caseine.
4. Influence of ripening on its acidity.

TOTAL LOSS OF WEIGHT IN THE RIPENING OF CHEESE.

The figures in the first three columns of the table below are based upon the actual weights of the cheese taken at the different intervals mentioned, reckoning from the weight of the green cheese in each case.

Table showing loss of cheese in weight in one, three and five weeks.

NUMBER OF EXPERIMENT.	POUNDS LOST IN WEIGHT FOR 100 POUNDS OF CHEESE.			Pounds of fat in 100 pounds of cheese.	Pounds of water in 100 pounds of cheese.	Thickness of each cheese in inches.
	In one week.	In three weeks.	In five weeks.			
1	2.55	5.19	7.45	23.7	42.0	7.5
2	3.45	6.03	8.42	30.6	37.0	4.5
3	3.54	5.56	7.49	34.5	34.8	5.0
4	2.84	5.92	7.91	30.4	37.8	5.8
5	3.37	5.18	6.58	35.9	33.4	6.0
6	2.75	5.44	7.44	34.5	37.4	6.5
7	2.73	6.98	9.30	39.0	35.9	6.3
8	3.43	6.85	8.87	44.6	32.2	7.0

The different cheeses vary in the amount of loss in weight for the first five weeks, from 6.58 to 9.30 pounds for each hundred pounds of cheese. This is a somewhat larger proportion of loss than is common in factories. It is probably accounted for by the fact that, during the first two weeks after the cheeses were made, the weather was extremely warm and there was no suitable place for storing the cheese at the time, so that they were not at this time kept at an even temperature. After the first month the cheeses were placed in a room of fairly uniform temperature and kept at sixty degrees to sixty-five degrees F. They were turned daily.

The cheeses that contained the largest amount of fat were, in two instances, the ones to lose to most weight, though the loss in most cases does not vary with the fat. The water contained in the cheese also appears to be in no way connected with the loss of weight. The cheese containing the largest proportion of water did not lose most, nor did the one containing least water lose least weight. The thickness of the cheese does not appear to be connected with the loss of weight. The cheeses were of uniform diameter, but varied as shown in the table, in the thickness. Cheeses of the same thickness lost quite different weights. The loss of weight was not uniform from week to week but shows considerable variation.

Influence of the ripening of cheese on the fat.

There are two sources of loss or change in the fat contents of cheese in the process of ripening, (1st) mechanical, (2d) chemical.

1. In the first stages of ripening, it is a familiar sight to see the outside of a cheese covered with fat that has exuded from the cheese, especially if the amount of fat in the cheese is large and if the cheese is stored in a room where the temperature is rather high. This loss of fat is what we may call mechanical as distinguished from chemical. Owing to the difficulty, previously mentioned, of securing samples of cheese to represent fairly the composition of the whole cheese the data furnished by analysis of the cheese are not satisfactory and are practically of no value in this connection. As the figures do not give us any real infor-

mation in regard to the changes of fat due to mechanical loss, they are not presented here. We can say, in general, that during the first five weeks of ripening, there was a loss of fat, as shown by analysis.

2. The chemical changes due to the ripening of cheese are mainly a decomposition of the fats with the formation of free fatty acids. These changes occur mainly after the earlier stages of ripening. No determinations of the amount of free fatty acids have been made up to date, but they will be made in the future analyses of the cheese.

Influence of the ripening of cheese on caseine.

The caseine in cheese undergoes various changes, forming, among other products ammonia and soluble nitrogen compounds, which are probably peptones.

About thirty years ago, Blondeau, a French chemist, and some others claimed that in the ripening of the cheese, the caseine slowly changed into fat. Muller, Sieber and Brassier have, however, shown that such a change does not take place. It is not uncommon even in some of our standard authorities on physiology to-day to see the erroneous conclusions of Blondeau referred to as undisputed facts.

The nitrogen denominations made in the cheese under experiment were, for the first five weeks, (first) the total caseine, etc., and (second) the proportion of nitrogen compounds soluble in water. In these determinations the same difficulty of sampling was found as already mentioned. In some cases, the different samples appeared to show an increase of caseine, which could not be accounted for only on the ground of a real difference in the samples analyzed.

In some cases there was little change from week to week, while in others there was a decrease in the amount of caseine.

The soluble portion was determined by agitating about two grams of cheese with cold water, in the proportion of 100 parts of water to one of cheese. The insoluble portion was filtered off, washed, and then digested by the Kjeldahl method for nitrogen determination. The soluble portion was thus determined by difference. While the results are not entirely concordant, they

are of considerable interest in this connection. In the table below we present the data in two forms, giving, first, the actual number of pounds of soluble nitrogen compounds in 100 pounds of cheese, and, second, the proportion of the total nitrogen compounds that were soluble in water.

Number of experiment	POUNDS OF SOLUBLE NITROGEN COMPOUNDS IN 100 POUNDS OF CHEESE.				POUNDS OF SOLUBLE NITROGEN COM- POUNDS IN 100 POUNDS OF TOTAL CASEINE, ETC.			
	In green cheese.	In cheese at seven days	In cheese at twenty-one days.	In cheese at thirty-five days	In green cheese.	In cheese at seven days.	In cheese at twenty-one days	In cheese at thirty-five days.
1...	.....	4.85	4.16	5.67	.....	17.6	15.5	19.7
2...	.....	2.97	2.78	5.64	.....	12.8	11.4	20.1
3...	.....	6.51	5.69	6.02	.....	26.7	21.8	23.5
4...	1.57	0.89	5.38	5.70	6.9	3.9	22.1	24.0
5...	.....	3.93	5.65	4.12	.....	16.2	22.8	16.5
6...	1.14	1.90	4.56	4.11	5.8	8.8	19.3	19.5
7...	.....	.....	5.77	7.06	.....	.....	25.6	30.0
8...	.....	1.19	5.57	6.48	.....	6.9	31.7	35.1

We notice the following points of interest:

First. In the fourth and sixth experiments, in which the cheese was analyzed as soon as taken from the press, we see that the amount of nitrogen compounds soluble in water is 1.57 and 1.14 per cent of the cheese. This, doubtless, represents the amount of albumen of the milk which was retained mechanically in the cheese. This constitutes six to seven per cent of the nitrogen compounds (the caseine and albumen together) in the green cheese.

Second. There appears to be a general tendency in the soluble nitrogen compounds to increase in quantity as the cheese becomes older.

Third. If we examine the last two columns in the above table we can see that there appears to be a tendency for the nitrogen compounds to become soluble more rapidly in those cheeses that contain the largest amount of fat. Leaving out the fifth and sixth experiments the tendency appears to be quite marked. In the first cheese the fat was least; in the seventh and eighth,

most. In the first cheese the proportion of soluble nitrogen compounds is least, while in the eighth case it is most, and intermediate in the other cases.

If future work should prove that this is a general tendency in the ripening of cheese, it would have a very important bearing upon the question of skim-cheese and rich cheese. The more rapidly the insoluble caseine becomes soluble the more easily digestible does the cheese become; and if the above tendency is found to hold good in all cases, then it would follow that skim-cheese becomes digestible less rapidly than rich cheese, so far as the nitrogen compounds are concerned.

In our future work on the ripening process we shall endeavor to make a more detailed study of the character of nitrogen compounds formed in the different stages of ripening.

Influence of ripening of cheese upon its acidity.

The acids formed in the process of cheese-making, chief of which is lactic acid, are retained mechanically, to some extent, in the cheese.

The method of determining the acidity of the cheese was to agitate a few grams of cheese with water for several minutes, then to filter and titrate the filtrate with standardized sodium hydroxide solution. The results were calculated for lactic acid.

In the table below is given the per cent of acid in the first and second wheys and in the cheese at different ages:

NUMBER OF EXPERIMENT.	POUNDS OF LACTIC ACID IN 100 POUNDS.		POUNDS OF LACTIC ACID IN 100 POUNDS OF CHEESE.			
	Of the first whey	Of the second whey.	In green cheese.	In cheese at seven days.	In cheese at twenty- one days.	In cheese at thirty- five days.
1	0.18	.....	.....	1.17	1.06	0.76
2	0.17	0.26	.....	0.69	0.79	0.65
3	0.16	0.26	.....	1.27	0.92	0.72
4	0.17	0.24	0.58	0.46	0.42	0.53
5	0.21	0.30	.....	0.64	0.73	0.54
6	0.16	0.25	0.62	0.52	0.56	0.54
7	0.25	0.39	.....	0.70	0.65	0.62
8	0.20	0.29	.....	0.58	0.72	0.51

1. It does not appear from the table that the amount of acidity in the cheese corresponds with the amount of acidity in the whey of the same cheese. If the treatment were exactly the same in every respect, we should expect to get a more acid cheese in the case where the whey is more acid, and we doubtless should; but with difference in treatment, we should not expect to get cheese with the same amount of acidity. In the fourth and sixth experiments, where the Cheddar process was used, the acidity of the cheese was least of all, and considerably less than in the second and third experiments, where the acidity of the wheys was about the same.

2. There is a general tendency, strongly marked, to decrease acidity as the cheese becomes older.

The decreased acidity is probably an indication of the extent of decomposition of caseine; the ammonia formed from the casein unites with the free acid, and thus diminishes the acidity. Whether in any case the conversion of sugar into lactic acid continues to take place in the cheese we cannot say.

Continuation of the study of the ripening of cheese.

The cheeses under experiment will be preserved, and the study of the ripening process will be continued until the cheeses are at least a year old. An effort will be made to make the future analyses more detailed, especially as regards the changes in the fatty compounds and the nitrogen compounds.

Points to be Investigated in Future Work.

The present investigation has proved fruitful in furnishing suggestions for future lines of work. Among the points which it is desirable to investigate more fully we may mention the following:

First. The maximum loss of fat that can be regarded as unavoidable in the manufacture of cheese from normal milk containing different amounts of fat.

Second. Whether, under the same conditions of manufacture, there is a definite relation between the amount of fat in the milk and the proportion of fat in the corresponding cheese; if there is such a definite relation, what is it?

Third. The cheese-making power or efficiency of fat in milk for normal milk containing different amounts of fat; that is, the relation of fat in milk to yield of cheese. For example, how much cheese should milk containing three per cent of fat, three and one-half per cent, four per cent, etc., produce?

Fourth. The conditions under which, and the extent to which, caseine is lost in cheese-making and in what manner such loss can be controlled.

Fifth. The relation of caseine to albumen in milk.

Sixth. The definite relation, if any exists, between the amount of caseine in milk and the proportion of caseine in the corresponding cheese.

Seventh. The cheese-making power or efficiency of caseine and albumen in milk.

Eighth. In what manner albumen can be incorporated into cheese and a good commercial article produced.

Ninth. In what manner and to what extent, if at all, rennet affects the ripening of cheese.

Tenth. An extended comparison of the stirred-curd and Cheddar processes of manufacture with reference to (1st) the loss of milk constituents, (2d) the composition of the cheese and (3d) the yield of cheese.

Eleventh. What changes occur in the ripening process (a) in the composition of the fat, (b) in the composition of the caseine and albumen, and (c) in the sugar.

SUMMARY OF RESULTS.

I. Loss of Milk-constituents in Cheese-making.

1. *Fat.*

a. The actual amount, as well as the proportion, of milk fat lost in the whey increased gradually but not uniformly, when the amount of fat in the milk increased.

b. The average amount of fat lost in the whey in all the experiments was about one-third of a pound for 100 pounds of milk, which was about 7.5 per cent of the milk fat. Taking only those experiments which most nearly represent average factory milk, the average amount of milk fat lost was one-quarter of a pound

for 100 pounds of milk, which was nearly seven per cent of the milk-fat.

c. While it was true that the loss of fat increased, both absolutely and relatively, when the amount of fat in the milk increased it was not true that all the additional fat above four per cent, or even about five and one-half per cent, was lost in the whey.

2. *Caseine and albumen.*

a. The amount of caseine and albumen lost appeared to bear no definite relation to the total amount of caseine and albumen in the milk.

b. The average amount of caseine and albumen in the milk in the eight experiments was 3.43 pounds per hundred pounds of milk; of this amount about twenty-three per cent, or about 0.8 pounds, were lost.

c. The irregular variations in the proportion of caseine and albumen lost were probably due to variations in the conditions of manufacture.

3. *Loss of fat and of caseine and albumen in cheese-making as influenced by proportion of fat to caseine and albumen in milk.*

a. When the amount of caseine and albumen in the milk was nearly the same as, or greater than, the amount of fat, the loss of fat was least. When the amount of fat became considerably greater than the amount of caseine and albumen, then the loss of fat increased. Comparatively large proportions of caseine served to hold the fat more completely in the curd, as would be expected.

b. The amount of fat in the milk appeared, in no way, to have any influence on the amount of caseine and albumen lost in the process of manufacture.

II. INFLUENCE OF COMPOSITION OF MILK ON COMPOSITION OF CHEESE.

1. *Fat.*

a. The proportion of fat in the cheese showed a tendency to increase, but not uniformly, when the amount of fat in the milk increased. There were about twenty-four pounds of fat in 100 pounds of cheese made from the skim-milk, while 100 pounds of

the cheese made from the milk richest in fat contained about forty-five pounds of fat.

b. Under the conditions of manufacture employed, cheese containing thirty pounds of fat per 100 pounds of cheese could not be made from milk containing less than three per cent of fat.

c. The fat exercised a greater influence on the composition of the cheese than any other constituent of the milk.

2. *Caseine and albumen.*

a. There appeared to be no relation between the amount of caseine and albumen in the milk and the amount of caseine and albumen in 100 pounds of cheese.

3. *Composition of cheese as influenced by the proportion of fat to caseine and albumen in milk.*

a. When the caseine and albumen were present in the milk in largest quantities relative to the fat, the proportion of caseine was greatest in the cheese, and when the fat in the milk was greatest relative to the caseine and albumen, the caseine in the cheese was least.

III. INFLUENCE OF COMPOSITION OF MILK ON YIELD OF CHEESE.

1. *Fat.*

a. The yield of cheese increased when the amount of fat in the milk increased, but not uniformly so.

b. In three experiments the increased yield of cheese was wholly due to increase of fat in the milk, while in the other experiments the increased yield was mainly due to increase of fat in the milk.

2. *Caseine and albumen.*

a. In several experiments the amount of caseine and albumen in the milk exercised no influence whatever upon the increase of yield, while in the other cases its influence was small as compared with that of the fat, and less even than the influence of the water retained.

IV. COMPARISON OF CHEDDAR AND STIRRED-CURD PROCESSES.

1. *Loss of milk-constituents in Cheddar process.*

a. Fat. In one case, when the milk contained about four per cent of fat, the proportion of fat lost was the same in both processes; in the other case, when the milk contained nearly five per cent of fat, the loss of fat was less than in the Cheddar process.

b. Caseine and albumen. In one case, the loss of caseine and albumen was three per cent less in the Cheddar process than in the stirred-curd process, while, in the other case, the loss by the Cheddar process was seven to nine per cent less than in the stirred-curd process. The causes of these differences were probably due to variations of conditions not, in any way, related to these processes.

2. *Influence of Cheddar process on composition of cheese.*

a. Fat. The cheese made by the Cheddar process contained a larger proportion of water and a corresponding smaller proportion of fat than the cheese made by the stirred-curd process.

b. Caseine and Albumen. No influence appeared to be exerted in regard to the proportion of caseine and albumen in the cheese.

3. *Influence of Cheddar process on yield of cheese.*

a. In both trials, the Cheddar process made a larger amount of marketable cheese, producing one pound more of cheese from 100 pounds of milk, than did the stirred-curd process.

V. COMPARISON OF COMMERCIAL AND HOME-MADE RENNET-EXTRACT.

In the two experiments, in which comparisons were made, no difference in any respect could be noticed that could be attributed to difference in the rennet-extract used.

VI. CHANGES TAKING PLACE IN THE RIPENING OF CHEESE.

1. *Total loss of weight in ripening.*

a. The loss of weight varied for the first five weeks from 6.58 pounds to 9.30 pounds for each hundred pounds of cheese.

2. *Changes of fat due to ripening.*

a. There was a mechanical loss of fat, the exact amount of which was difficult to determine.

3. *Changes of caseine due to ripening.*

a. There was practically no appreciable loss of caseine during the first five weeks.

b. Analyses of two green cheeses indicated between one and two per cent of albumen in the cheese.

c. There appeared to be a general tendency for the insoluble caseine to become less in quantity and for the soluble nitrogen compounds to increase.

d. The soluble nitrogen compounds showed a tendency to increase more rapidly in the cheese containing the larger amounts of fat.

4. *Changes of acidity due to ripening.*

a. The acidity showed a marked tendency to diminish as the cheese became older.

VII. SOME PRACTICAL APPLICATIONS.

1. *Milk-fat as a basis for purchasing milk at cheese factories.*

a. The method of paying for milk at cheese factories according to the amount of milk delivered regardless of its composition is unjust to the producers of the better milk. Payment for milk on the basis of the fat contained in it is the best method yet proposed, mainly for three reasons, (1st) the milk-fat appears to exercise a greater influence upon the composition and yield of cheese than does any other constituent of milk and therefore forms a just basis for estimating the cheese producing efficiency of factory milk; (2d) payment for milk according to its fat encourages and induces dairymen to produce a better quality of milk; (3d) payment for fat in milk removes any temptation to adulterate milk.

2. *Skimming factory-milk.*

a. Taking the average factory-milk of this State it is probable that it is none too good for cheese-making and that removal of cream diminishes both the yield and quality of the cheese.

b. It seems probable that, under ordinary circumstances, a better money return can be expected from average factory-milk when made into whole-milk cheese than when skimmed partially and made into butter and skim-milk cheese.

In conclusion, permit me to call attention to several things which I deem important in connection with this work. From

observations which I have made since I have been connected with this department doing this work, I have drawn certain conclusions which it seems to me the facts fully warrant, and it is to these that I beg leave to call attention.

I have observed during my work this season, that wherever we have been during previous seasons, instructing and aiding in the work, and where they have adopted our methods of working and caring for their milk and cattle, that the quality of the product has been greatly improved. The work we have performed this season has also greatly improved, so that the results that we have seemingly produced lead me to believe that it is not only possible, but probable, that a continuance of this work will produce a condition of things whereby the cheese product of the State of New York will all be of a uniform first grade and will take such standard in the markets of the world.

Our experience and experiments have opened up to us new views as to the possibilities in this product, which if they can be carried out, and there is no doubt of their feasibility if means are provided, that will make the cheese product of this State not only one that will command a first position in the markets of the world, but will make it much sought after by consumers at home, not only as a healthful article of food but a desirable one.

It is not to be denied, neither is it to be overlooked, that many of the consumers of cheese in times past, have been much abused by having thrust upon them a product called cheese, which was in no wise worthy of the name.

When the cheese-makers of the State shall succeed in producing an article that will recommend itself to the consuming public, they will not only increase both their foreign and home market, but they will also produce a result which it seems to me that the Legislature has been striving for in enacting these laws, namely, to bring this product made within the State to such a standard that it will always be uniformly healthful, thus doing away with the demand by dealers, whose aim is to make money, for a cheaper article or imitation products, which are quite apt to be unhealthful, as they are made from milk from which more or less of the fat has been extracted.

It is true that this fat is one provided by nature and is intended for the stomach, and is not only easy to digest but an aid to other foods in the process of digestion.

If this kind of cheese ceases to be in demand on account of a greater demand for a wholesome product, then by one stroke we have produced a desired result of doing away with such as a fraudulent and unhealthful article.

It is a fact that should be borne in mind in considering this subject that a great deal of sickness has been caused by the eating of cheese; whatever may have been the direct cause, whether it was tyrotoxican or some other equally unknown term, I will not attempt to say, but I do believe that it was not produced by cheese of such grade as we are endeavoring to have produced in this State, and I believe, from a healthful standpoint alone, that the people of this State are fully warranted, and it is their duty to do what they can to carry this work to a successful issue.

GEORGE A. SMITH,

Cheese Instructor.

Report of W. W. Hall.

Hon. J. K. BROWN, *State Dairy Commissioner, Albany, N. Y.*:

Dear Sir.—I have the honor to submit the following as a report of the work performed by me as cheese instructor during the year ended September 30, 1891.

In the early part of October, 1890, I was engaged in collecting samples of full-cream cheese made by me to be analyzed by our chemist for the annual report of 1890, after which I gave instructions in cheese-making by actual process in a small combination of factories in Jefferson county.

The reputation of this combination is good, but the proprietor is anxious to gain all possible information, and he requested me to assist his makers for a few days. He had always believed, and so instructed his makers, that any way that the curd was agitated during the heating process, except by hand, was injurious to it, besides wasting a large portion of the solids.

I explained to the makers wherein I believed they were mistaken and purchased a common lawn-rake and introduced it into his factories. I used great care in operating it and, after spending two days at his factories and doing all the agitation with a rake from the very beginning, I convinced his makers that it not only saved a great deal of hard labor, but the curd could be kept in a better condition and a larger yield could be obtained than by hand. When I visited these factories the past summer they were using the rake successfully and told me they thought it a great improvement over the old method. The factories are quite numerous throughout the State, particularly in the western counties, where no agitators are used, because the proprietors believe their use causes a loss in the product.

My experience of twenty years in cheese-making teaches me that a common lawn-rake, if properly used, will accomplish more both in time and economy of product than two men can by hand.

It is certainly a mistaken idea that the agitation of a curd must be done slowly. If the milk is set at a proper degree of ripeness, the curd is cut at the proper time, and the agitation is started at once, a film or coating begins to form immediately around the curd.

This is caused by the temperature at which the milk is set, stimulating the rennet action which acts on the caseine of the milk and shrinks it, making a covering to the kernel, which allows the whey to pass out through the pores of the covering while retaining the solids. To do this successfully the curd must be kept constantly agitated; there is no danger of breaking the film if reasonable care is taken. If it is necessary to cut the curd into one-half inch cubes, as all good makers will admit, it is just as necessary to keep it agitated so they will not be allowed to become packed together. The heat necessary to expel the moisture from the kernel cannot penetrate a cube larger than one-half inch; hence, the necessity of keeping each cube floating separately in the whey, and a rake will do this more successfully than by hand.

Later in the month I was called to Canton to assist a maker who had been troubled with a disagreeable flavor in his cheese. He had tried to overcome the difficulty but had failed. He had a good reputation as a cheese-maker, and was puzzled to know the cause. He asked me to investigate the matter and see if I could not ferret out the cause of his trouble and remove it.

My first experience was not satisfactory. I tested all his milk by setting each dairy separate and keeping the temperature up to seventy-five and above and holding it there all day. When the cheeses were made and ready for the press I could not discover any thing wrong; the milk worked well, and all was satisfactory so far as I could discover. Each patron's milk stood the test well. I did not discover a bad odor in any of it. The factory was the model of neatness. I finally told him I would go home, and if the cheese made that day had bad flavor I would live with him until I found out the cause and removed it. Within a short time I was notified that those cheese, while in texture and every other way were fine, in flavor had not been improved. I went at once, in company with

Mr. M. T. Morgan. I took with me a sample of pure rennet-extract from my own factory. Mr. Morgan assisted me in making the cheese, and we gave the milk the same test as before, with as good results. I was informed in proper time that the flavor of the cheese made that day was perfect. Mr. G. A. Smith, of Frankfort, accompanied me to the factory to inspect them after they had become well cured, and found them very fine. I hesitated to believe it was the rennet-extract, because I knew where makers were using the same brand with good success, but after trying everything else to remedy the trouble and failed, I knew this must be the cause. It is a very important matter that makers obtain a brand of extract that is known to be pure; however, the best extract may become impure.

I spent the balance of October among factories in St. Lawrence county. October twentieth, I went to Albany to consult with our chemist with reference to red spots which appeared in cheese which I had sent him for analysis. In a portion of the month of November I was engaged in office work and attending farmers' institutes. During the months of December and January, I did but little work for the department except to arrange for holding small dairy meetings.

On February 10, 1891, in company with M. T. Morgan, of Herkimer county, I went to Chautauqua county for the purpose of holding dairy meetings. Mr. W. J. Corbett, milk inspector, had arranged for them throughout his county. It was the intention that these meetings should be held back from towns where the farmers' institutes had been held, and Mr. Corbett so arranged them.

We gave instructions on care of stock and the proper care of milk before it was delivered to cheese factories.

The dairymen turned out and gave us good audiences and were very much interested in the subjects discussed. The meetings continued through the months of February and the first days of March in Chautauqua and Allegany counties.

On February 18, 1891, we held a meeting at F. W. Edmunds' creamery, Sherman, N. Y., and made full-cream cheese, to instruct

his makers as well as others who would attend. We had a good attendance.

It was the custom of the creamery to allow the patrons to deliver their milk but three times per week; it was a great accommodation to the patrons as they drew it a great distance. It was separated by a Danish Weston separator and the separation was said to be perfect, but for our use it was over ripe. The following is the analysis of the cheese made by us when well cured:

Total solids	73.73
Water	26.27
<hr/>	
Total solids and water.....	100.00
Caseine	36.69
Fat	33.87
Ash	3.17
<hr/>	

The low percentage of moisture, 26.27, is accounted for by stating that owing to the over ripeness of the milk we were compelled to use all our skill to prevent the acid developing before the moisture could be expelled and we were very successful.

It only proves that the question of ripening milk before setting is an important one. It is beneficial in many ways. The rennet acts on the solids of the milk more promptly, the moisture passes out more freely, the solids can be retained easier, and the development of acid at a proper time assists in purifying the flavor of the curd and prevents the development of the putrefaction ferment. It is now being conceded by all good makers that the ripening of the milk before setting is the most important part of the whole process. The test that is being generally adopted by makers to determine when the milk is ripe enough to add the rennet and for best results generally, is as follows: A tin cup with the bottom loaded with solder, so it will float in the vat of milk and one that will hold about one pint, should be owned by every maker.

After the whole mass of milk is thoroughly mixed in the vat at a temperature of 84 degrees, eleven ounces should be carefully

measured out in a graduate and turned into the cup and allowed to float so the temperature will remain the same as the whole mass in the vat; then add to the eleven ounces of milk in the cup one cubic centimeter of rennet-extract and stir quickly. If it coagulates in two minutes the milk is ripe enough to set for good results during the process of cheese-making.

If it requires longer than two minutes the maker should be supplied with some clean sour milk and add such a quantity to the milk in the vat as his judgment dictates and allow it to be thoroughly mixed with the whole mass. It must be held for a few moments and then make the rennet test again. This starter will develop the lactic acid at the setting temperature of 84 degrees so the milk will correspond to the rennet action in the two minutes required. I urge all makers to always have a small quantity of sour milk on hand to use at this stage in the process.

There are but few vats of milk delivered at cheese factories during the entire season but that would be improved by its use. This rennet test does not always determine the degree of acid the milk contains. In some cases in the warmest weather a something in milk like rennet will coagulate it without the use of any rennet at all; in cases where this taint is partially developed, the milk may respond to the one cubic centimeter of extract in due time, and yet there may be no development of acid. At such times the maker must determine the ripeness of the milk by sense of smell, and should use sour milk liberally.

A small pipette and a graduate are necessary to make this rennet test. The graduate to measure the milk to be tested and the pipette to measure the extract. They can be purchased at a small cost. The vat of milk above referred to was ripe enough, so no rennet test was needed.

Through the months of March and April I attended dairy meetings in the counties of St. Lawrence and Jefferson and Cayuga, and gave instruction in cheese-making in St. Lawrence county, besides making several tests in private dairies with the Babcock test. While many of our factories have been afflicted heretofore with the troublesome red spots in cheese, early in the spring, I found by visiting all of them not one could be found. We

realize it is a very difficult matter to ascertain just what causes these spots, and it may be more difficult to remove them after they are found. One thing is certain, it is gaining ground fast in this section of St. Lawrence county. Unless something is done to prevent its spreading it will be but a short time before all will experience the loss it brings in the sale of the product. As you are aware, I have sent samples of this spotted cheese to some of the chemists, who have investigated it, but so far have been unable to satisfactorily solve the problem. Dr. Clark, our department chemist, has reported that he has found the spots to be the "widus" of a peculiar bacteria.

I spent the month of May and a portion of June in St. Lawrence county, as is shown by my weekly reports, in cheese instruction.

On June twenty-fifth I made cheese in L. C. Cooper's factory, Theresa, N. Y., and spent the balance of the month in that section. During the first days of July I gave instructions among the Stone combination in Jefferson county. From there I went in the vicinity of Carthage, same county, and was ordered to Union factory, town of Croghan, Lewis county. When I arrived at the factory, I inspected the cheese on the shelves; after this was done I handed the maker my telegram from C. S. Kellogg, our milk inspector, ordering me there, and asked him if he wanted any assistance in any way, and he said there was no necessity for it. I spent the balance of the week at Fargo, De Bois Corners and Spring Brook factories, and I had very satisfactory results. The maker of the Du Bois Corners factory wrote me a letter, in which he stated that the cheese turned out perfect. On July thirteenth, in company with M. T. Morgan, of Herkimer county, I went to Chautauqua county. Mr. W. J. Corbett, the milk inspector, had arranged a list of factories for us to visit. I took with me the Babcock tester and made tests in nearly all factories that I visited in that county. A few of the tests that were made in that county on July sixteenth were as follows:

Number lactometer test	Babcock test per cent of fat.
107	3.4
106	3.6
108	3.9

Number lactometer test.	Babcock test per cent of fat.
109	4.0
108	3.8
111	3.4
110	3.3
109	4.0
110	3.6
105	4.1

On July seventeenth, the following were made at West Ellery factory:

Number lactometer test.	Per cent of fat.
No. 1	3.7
No. 2	3.8
No. 3	3.7
No. 4	3.6
No. 5	3.8
No. 6	4.2
No. 7	3.2
No. 8	3.5
No. 9	4.0
No. 10	4.0
No. 11	3.4
No. 12	3.2
No. 13	3.6

On July eighteenth, the following tests were made at Centralia factory, only the fat test was taken here:

Number lactometer test.	Per cent of fat.
No. 1	3.4
No. 2	3.8
No. 3	3.6
No. 4	3.5
No. 5	4.0
No. 6	3.6

Number lactometer test.	Per cent of fat.
No. 7	3.5
No. 8	3.6
No. 9	4.4
No. 10	4.2
No. 11	3.2
No. 12	3.7
No. 13	3.7

On July twenty-first, I made the following test at Troupsburgh:

Specific gravity.	Per cent of fat.
101	3.8
104	3.7
107	3.8
109	3.2
108	4.0
107	4.0
103	4.0
106	3.9
106	3.6
106	3.6
110	4.6
108	3.7

On July twenty-second, the following tests were made at Rowley's factory, town of Kennedy:

Number lactometer test.	Per cent of fat.
105	2.7
106	4.2
108	3.7
105	3.8
110	3.2
105	3.7
107	3.6
104	3.8

July 23, 1891. The following at Ellington No. 3:

Specific gravity.	Per cent of fat.
108	3.6
107	3.3
106	4.2
107	4.4
106	3.8
104	3.5
104	3.5

On July twenty-fourth, the following at Ellington No. 2:

Number lactometer test.	Percent of fat.
113	3.8
106	4.1
100	4.9
108	3.6
105	3.7
106	3.6
100	3.4
109	3.7
105	3.6
107	3.9
108	3.7
108	4.0
106	3.4
105	4.0
102	3.8
106	4.0

July twenty-fifth, Creek factory, C. D. Leonard, proprietor:

Specific gravity.	Per cent of fat.
107	3.4
105	3.6
107	4.4
112	3.3
109	3.6
102	4.4

Little Valley. Here we made a test of their milk and made the cheese. We spent one day with Dr. McDuffie, Olean, N. Y., in his laboratory with the Babcock test. From this point Mr. Morgan was called back into Chautauqua county, and I went to Cuba, Allegany county. In this county I instructed in Spring Brook, Black Creek, Andover, No. 2 Cuba, and Transit Bridge factories.

At the last-named factory the following tests were made:

	Per cent of fat.
Dairy No. 1	4.0
Dairy No. 2	4.2
Dairy No. 3	3.8
Dairy No. 4	3.4
Dairy No. 5	4.0
Dairy No. 6	4.0
Dairy No. 7	3.4
Dairy No. 8	4.2
Dairy No. 9	4.3
Dairy No. 10	4.2
Dairy No. 11	3.4
Dairy No. 12	4.0
Dairy No. 13	3.9
Dairy No. 14	4.0
Dairy No. 15	4.0
Dairy No. 16	4.0

We spent the balance of the month of August in this county. The first half of September I spent in St. Lawrence county. I made a test of milk in West Hermon factory, St. Lawrence county, on September tenth, as follows:

Number actometer test.	Per cent of fat.
108	4.5
109	4.3
106	4.7
106	4.7
107	4.3
101	4.9
107	4.2

On September twelfth, at East Gouverneur factory, as follows:

	Per cent of fat.
No. 1	3.8
No. 2	4.2
No. 3	4.2
No. 4	4.6
No. 5	4.0
No. 6	4.0
No. 7	4.2
No. 8	3.8
No. 9	4.1
No. 10	3.7
No. 11	3.6
No. 12	4.4
No. 13	3.9

On September fifteenth, in company with G. A. Smith, visited the experimental farm, at Geneva, for the purpose of making some experiments, which I will leave for Mr. Smith to report.

I am satisfied the method of cheese-making, as well as the care of milk, throughout the State, is improving, and yet there is plenty of room for more. The quality of the cheese can be greatly improved and extravagance in its manufacture stopped.

I believe that the condition of the milk, when it is delivered to the factory, together with the negligence and ignorance of many makers as to the proper manner of working a vat of milk, is causing an unnecessary loss to the patrons, amounting to sufficient to pay their taxes each year.

If, with all the conveniences at our command at Geneva, and with all the care and attention we gave the experimental work, the report shows quite a loss of solids, what must it be at the average factory. It is impossible to retain all the solids, but there is no necessity of the great loss that is generally going on among factories. The makers, in many cases, seem to think, and have been so instructed, that it is necessary to have a quantity of white thick

they run from the curd after it is ground to insure good cheese. They seem to think because they have consumed a large quantity of milk for a pound of cheese that the cheese ought to be good. Local buyers, who never made a cheese in their life, give too much advice to makers. They tell them they must not be afraid to use plenty of milk; that they cannot make good cheese unless they do. This stimulates the class of makers who have had but short experience in the business to become reckless in the habit of handling it; instead of expelling the moisture and retaining the solids they reverse it, which not only costs in the amount of solids they lose, but the fat that runs away is what gives the product the rich, nutty flavor the buyer is willing to pay for.

Little can be accomplished by cheese instruction as long as so few men try to cover so much territory. My idea is that a certain district be set apart to one man and he made responsible for the work in that district; give him such assistance as he needs at a time when he cannot attend to all the calls himself.

The makers are beginning to depend on this assistance and they will improve under it if they can have enough of it to do them any good. One day with a young maker is not of sufficient value to him; there is too much to be taught in so short a time.

I am aware that you are employing all the instructors now that your appropriation will allow, and that they are doing all they can, yet I see enough that is needed to be done, that I feel that the Legislature could not spend the money necessary to make the work complete in any way which would bring so much "value received" to the people of the State.

W. W. HALL.

Report of M. T. Morgan.

Hon. J. K. BROWN, *State Dairy Commissioner*:

Sir.—In conformity with my duty I hereby submit my report of the work performed by me, as cheese instructor, for the year ending September 30, 1891.

In the month of October, 1890, I was called to St. Lawrence county to hold a conference with W. W. Hall, cheese instructor, for the purpose of overcoming, if possible, a flavor, termed by the cheese trade rancid, and ascertain the cause thereof.

Upon investigation and careful examination of the milk, we found that it came to the factory in good condition; we also found that the rennet-extract used was not good. I then visited several other cheese factories in St. Lawrence county. The general make of the cheese, with one or two exceptions, was fine.

In the months of December, 1890, and January, 1891, my work was principally confined to the inspection of milk delivered at milk stations on the line of the Delaware, Lackawanna and Western railroad.

In February and March my time was occupied in holding dairy meetings at cheese factories and small villages in Chautauqua, Cattaraugus and Allegany counties, in company with W. W. Hall of St. Lawrence county. These meetings were inaugurated for the purpose of instructing the farmers in the best methods of rearing the dairy, feeding for milk, and its care and proper delivery to the factory.

They were well attended by the dairymen, who manifested much interest, and took part in the discussions. I feel secure in asserting that the benefits arising from these gatherings have met the fondest hopes of the department, as well as of the dairymen of the above counties, as my visits the following summer proved this to my personal satisfaction.

In the months of April and May, at the request of the dairymen, I visited factories situated in the counties of Herkimer, Otsego and

Chenango. In the main I found methods adopted by the cheese-makers to be above criticism, with this exception, i. e., they were inclined to a great extent to see from how little milk they could make a pound of cheese and get the same off the factory shelves. The result of the above effort was, that the cheese retained an excess of moisture, and, as a rule, the makers failed to draw the line between milk produced from fodder and that from fresh succulent food from the pastures, and the round up in the latter part of May was disastrous in many instances; the product being open, musty, poor-flavored cheese, this was on account of retaining too much moisture.

In June, and the fore part of July, I was called to the county of Jefferson by the request of Mr. Charles Kellogg, milk inspector for the department. Together we visited the cheese factories that were most in need of help. In the majority of the factories of Jefferson county the character and style of cheese produced is for exporting through Montreal.

I found the paramount trouble with the makers was that their product contained too much moisture to meet the requirements of that trade. Upon investigation I found that there was great rivalry between the several factories represented on the Jefferson County Produce Exchange at Watertown.

The cheese sold at that place was guaranteed; in many, rejections from Montreal were such as to place the maker in a condition of financial embarrassment. The milk delivered at the factories which suffered the most from rejections on these products was received in poor condition, owing principally to the fact that it was not properly aerated.

My time being limited, as per instructions, I was compelled to transfer my labor to Chautauqua county, on account of repeated calls for instruction from Mr. Walter J. Corbett, who represents the commission in that county.

I again visited Jefferson county in September. Here I found the same conditions existing in other factories that I found in June; the need of instructions was so urgent that Mr. Charles Kellogg had been compelled to assume the responsibility of

instructing makers in several factories, relying in his work upon the knowledge he had gained from the department instructors.

The knowledge I gleaned of the character of the milk produced in the western part of the State upon my previous visits to that section led me to believe that it carried more of the fats than milk produced in the older dairy section of central and northern New York.

The above condition became so apparent to me that I reported the same to the department upon my return, whereupon I was instructed to accompany Mr. W. W. Hall, with his Babcock milk tester, to that section of the State to ascertain that fact for a certainty.

The results of these tests proved conclusively that the opinion which I had previously formed was absolutely correct.

At several of the factories where these tests were made the patrons were invited to be present. It proved a great benefit to maker and patrons, and through it we imparted to the farmer the knowledge of his milk as regards its richness, and we were thereby better enabled to instruct him as to proper treatment and care.

The cheese manufactured in Chautauqua county is largely for the home trade and the stirred-curd process prevails to considerable extent. The makers are led to believe that if they practiced the Cheddar process they would waste fat, but as they become acquainted with this plan they become convinced that the moisture can be expelled in the whey before the acid appears.

They, therefore, as a rule, adopt this Cheddar process and mill their curd, believing it to be the easiest and safest plan.

We visited the Marshfield combination which for the first time has ground its curd this season, and in their warehouse at Collins, Erie county, was over 6,000 fine export cheese and as even as though all had been made in one factory.

I think that the ratio of milk for a pound of cheese will average less than in former years under the stirred-curd process.

Respectfully yours.

M. T. MORGAN,
Cheese Instructor.

Report of R. D. Clark, M. D.

Hon. J. K. BROWN, *New York State Dairy Commissioner* :

I have the honor to submit the following report on

Bovine Tuberculosis :

It is known also as phthisis, consumption, scrofula, wasting, pining, grapes, etc.

This disease has been the bane of civilized humanity for centuries. Its contagiousness has also been the subject of much study and dispute for many years. Morton, 200 years ago, deemed it infectious (Brush's Bovine Tuberculosis).

But the discovery of its transmissibility from the lower animals to man is of comparatively recent date and is a matter fraught with the deepest importance to mankind, as it is found to be common among our domestic animals, especially the cow, and this importance is more fully appreciated when we come to know that the disease is transmitted to man not only through eating the flesh but also through drinking the milk of diseased cows.

Those who have followed this subject in its revelations have become thoroughly awakened to its importance, but as these are mostly medical men, and not all of them, by any means, are yet awakened, and that all may be made aware of the danger lurking round them we have undertaken this article.

In order to give a comprehensive view of the subject, it will be necessary to go into detail somewhat. However, in describing the disease we will avoid the use of technical terms as much as possible.

Description of Tubercles.

The disease, tuberculosis, derives its name from the characteristic initial lesion known as tubercle. It has been called a constitutional disease, characterized by a localized irruption of tubercles in different parts of the body, often in the lungs. The

initial tubercle is of a pearly gray nodule (sometimes it is a yellowish gray) from one to two millimeters in diameter. It is composed of lymphoid cells, epithelioid cells, and in the center a large cell with several nuclei, called a "giant cell," and always more or less bacilli, which are most abundant in and near the giant cell. These are held together by a delicate network of connective tissue resembling the stroma of a lymphatic gland. Sometimes the giant cells are scattered throughout the tubercle and form a large portion of it; sometimes only one cell exists, and, again, none of these parts are present except the lymphoid cell and bacilli. The initial tubercle is the same in whatever part of the body it occurs. In the lungs they usually make their first appearance in the connective tissue under the pleural membrane, extending into the interlobular connective tissue, gradually encroaching upon the air cells, till, by their rapid aggregation, they completely obliterate and take the place of the air cells. In this manner they often increase the lungs to three, four or five times their natural size, so that the lungs may reach fifty to sixty pounds in weight.

These tubercles multiply sometimes very rapidly and congregate together in and around the part from which they proceed — which is usually the bifurcations of a small artery, sometimes they form around a capillary, like a bead — forming excrescences varying in size from a millet seed to that of a grape. In the cow, certain structures show numerous clusters of these grape-like appendages from which appearance comes the name "grapes," which has been applied to the disease by butchers.

These tubercles contain no blood vessels in their structure and consequently are poorly nourished and tend to undergo early decomposition. (It is thought by some that the bacilli help in the decomposition).

Beginning at the center, the tubercle breaks down into a cheesy mass of fat granules, shrunken white blood corpuscles, and amorphous matter. As this takes place the tubercle becomes yellow in color.

This process of cheesy degeneration proceeds from the center towards the circumference. Other tubercles form around and upon

the original, and break down by the same process until greater or lesser masses of cheesy matter are formed, which generally becomes softened, and, if in connection with a duct or bronchial tube, is carried off; if not, it is reabsorbed into the system, leaving ulcers, and when in the interior of solid organs, such as the lungs, kidneys, etc., cavities.

Sometimes the cheesy material becomes calcified into lime salts rendering it innoxious.

Sometimes a change takes place in which the cells are shriveled up and are absorbed and the connective tissue element enlarges forming a hard, horn-like tubercle which remains permanent. When this change takes place over a large part of the diseased lungs it gives rise to what is called fibroid consumption and the patient may live for years.

Causes of Tuberculosis.

Heredity has been considered a cause of tubercular disease from its earliest history, and, at one time, it was considered essential to the development of the disease.

Hereditary predisposition is described to be direct and indirect, that is, direct where the disease is transmitted from sire or dam to their immediate offspring; indirect, when transmitted from second or third generation, constituting atavism.

Breeding in-and-in is considered to be the most potent cause of the inherited tendency. In regard to this Walley says: "No predisposing cause with which we are acquainted, exercises such a potent influence in the production of tubercle as this; from sire to cow, from dam to offspring, from generation to generation — often in unbroken succession — the fatal tendency is transmitted, the more consanguinity is multiplied, the more the tendency is increased, and the greater the virulence of the resulting products."

Dr. Brush says :* "I think there can be no doubt whatever that the in-and-in breeding of animals, with two or three permanent varieties only to the species, does produce a constitutional weakness, to say the least, that is not capable of resisting bacillary tubercular infection. Tuberculosis itself is rarely an inherited

* Consanguineous Breeding in its Relation to Scrofula and Tuberculosis, page 14.

disease in the bovine tribe, where this disease is indigenous. I have myself examined many foetal calves, whose mothers were dead from acute miliary tuberculosis, without ever finding the gross evidence of tubercular infection; so I think it safe to say that the rule is that the disease is not transmitted by inheritance." He says also:§ "This susceptibility, arising from any or all the causes enumerated, may be present in some individuals in a community, and, unless the inbred dairy cow is a producer of food for that community, these cases, be they more or less numerous, will not suffer from tubercular consumption. There are localities with a rigorous climate, resulting from their altitude, where dairy cattle cannot be closely inbred, because inbred cattle could not stand the severity of the climate, and they are not, by reason of their breeding, tubercular. Such animals are not deemed by the modern breeder as the best dairy animals, for, requiring, by reason of their vigor and robustness, more of the food that they consume for their own nutrition, they have less of this food available for making milk. In the highlands of Scotland and the Hebrides, where these creatures abound, the countries are not known as dairy countries, neither are they tubercular."

Dr. Brush has studied extensively the condition of various countries in relation to this matter and states:* "It is only in large masses of facts with numbers of living beings whose origin, pedigree, modes of breeding, and all other concomitant facts are taken together, that we can reach a clear solution of the connection between consanguineous unions and their train of diseases. Thus I have ascertained, taking the whole world as the field of observation, that human tuberculosis exists only in those communities closely associated with the inbred bovine species. This observation does not, of course, exclude the now acknowledged fact that bacillary phthisis can be conveyed from one human subject to another by contagion, because this is a part of the fact that the original contagion was derived from the bovine species;

§ On the Coincident Geographical Distribution of Tuberculosis and Dairy Cattle, page 5.

* Consanguineous Breeding in its Relation to Scrofula and Tuberculosis, pages 4-5.

thus where the inbred tubercular cattle are unknown, bacillary phthisis is unknown.

"I do not desire to discuss any of the questions relating to race problems, but, from several years of close study of the methods of cattle-breeding and their diseases, and of their intimate relationship to mankind, I am convinced that the bovine race is scrofulous, the result of close consanguinity, and tubercular from their scrofulous habit, and this fact is almost too well known to need the addition of anyone's testimony, as a great majority of those who have studied the subject are agreed on this point. But I am thoroughly convinced, as I have said before, that the inbred bovines, by reason of their scrofulous habit and consequent susceptibility to tubercular disease, convey to the human race bacillary phthisis."

In another place he writes: "If we take countries like Algiers and Egypt — where the tubercular bovine is still absent, but the human consumptive present, and the native population still exempt — we surely see the danger of contagion from human to human is not imminent; while on the other hand, if we take countries like Madeira, Australia, and the Sandwich Islands, we find very plainly that the introduction of inbred dairy cattle tubercularizes the natives. I do not mean to imply that every one who drinks milk from tubercular cows will become tubercular, for, if this were a fact, instead of the deaths from pulmonary consumption, forming one-seventh of the whole mortality, the great majority of civilized races would have become extinguished by the disease. I have known many cases of children and adults taking, for years, the milk of tubercular cows and yet exhibiting no symptoms of tubercular infection. We must always remember that some other systemic condition is necessary as well as the germ for the development of this disease; scrofulosis, temperature, certain hygienic or climatic conditions that tend to lower resistance, are all factors in the causation of a susceptibility to infection. * * *

"Let us now direct our attention to regions where cattle abound, but not as inbred dairy stock, and where, consequently,

* On the Coincident Geographical Distribution of Tuberculosis and Dairy Cattle, pp. 4, 5

milk is not an article of diet. Such is South America. In Columbia the practice of milking cows was laid aside, owing to the great extent of the farms and other circumstances. In a few generations, M. Rollin says, 'the natural structure of parts, and withal the natural state of the functions, has been restored. The secretion of milk in the cows of this country is only an occasional phenomenon and contemporary with the actual presence of the calf. If the calf dies, the milk ceases to flow.*' Holden,§ in his interesting book on this country, says that butter is unknown, milk only occasionally used, and only extracted from the cows when they have their calves with them, and always boiled. This author also adds, in his chapter on diseases in this country: 'There is little or no consumption; I do not recollect of a single case.'"

In his work on Cattle and Cattle Breeding, William McCombie says: "To continue for any length of time to breed in-and-in is not only against my experience, but I believe against nature."

Predisposition, even in man, however, is held by some to be more of a tendency to chronic inflammation of certain organs, especially of the lungs, mucous membrane, and lymphatic glands, than to the primary development of tubercle; the localized tubercular growths being secondary to and resulting from the direct irritation or infective properties of the inflammatory product (Hill). Dr. Sanderson says: "Three things are necessary for the establishment of phthisis; first, a constitutional predisposition; second, a local irritation, leading to an increased growth of pre-existing lymphoid structure; and third, a process of infection, by means of which morbid growth extends to adjacent or related parts."

(Buhl held that the growth of tubercle was due to the absorption of cheesy matter, resulting from an inflammatory process, which Villimen disproved).

This view meets with universal approbation, and as we shall see later, the local irritant has been found to be a living germ. Though the irritant be a living germ,

*Prichard, Nat. His. of Man, London, 1843, p. 84.

§Holden, New Granada, New York, 1857.

it is found that a condition of the system which favors its development is requisite. Now, one condition, at least, which constitutes a predisposition is a tendency to a low form of inflammation, giving rise to chronic enlargement, especially of the lymphatic glands, which sometimes suppurate. This condition is known as scrofula. Scrofula is an ill-defined condition of the system in early life, due to malnutrition and a consequent defect in the formation of the tissues which are disposed to chronic inflammation, the products of which are prone to undergo cheesy degeneration.

It has been associated with tuberculosis, in a causative relation, for years, and their identity has been a controverted question by most modern writers.

The name is derived from the hog, in which animal the disease resembles tuberculosis so closely as to make the belief in their identity tenable; and, indeed, recent investigations have shown tubercle bacilli present in all local forms of scrofula.*

Mr. J. H. Steel, M. R., C. B. S., says: "Scrofula is a disease of the system of which tuberculosis is a manifestation."

Dr. Bush says:§ "The well-known scrofulous forms in animals and the human kind are, unfortunately, the largest milk yielders. Therefore in some of the noted milking breeds the form sought after by breeders is that which will correspond with the delineation of the characteristic form of scrofulosis. * * *

"Now, scrofula is not always tuberculosis, but I believe that scrofula precedes tubercular infection."

This condition or predisposition to tuberculosis may be acquired in animals originally healthy, and the circumstances giving rise to it are: breeding from very young heifers, over breeding, defective drainage and ventilation, long confinement in dirty, dark, close stables, innutritious diet, excessive secretion of milk induced by the forced system of feeding, long continued feeding of stimulating food for the purpose of producing large quantities of milk and prolonged lactation even though proper food is given. It is a matter of common observation that the best milkers are most prone to consumption.

* Micro-Organisms, A. B. Griffith, pp. 287-91.

§ Consanguineous Breeding in its Relations to Scrofula and Tuberculosis.

Bad food producing indigestion is another active cause; indeed, indigestion has held for a long time a permanent place in the causation of consumption. It was asserted by M. Butel, of Manx, Dr. Robinson, of Constantinople, and others, at the congress on tuberculosis, held at Paris in 1888, that phthisis in man was much oftener produced by the digestive than the respiratory functions.

Physical conformation enters into the causation. Of this Professor Walley observes: "Those animals possessed of light barrels, narrow chest and disproportionally long legs are undoubtedly more predisposed to tubercle than those in which the conformation is said to be perfect; but it must not be forgotten that these physical defects are often in themselves evidences merely of stunted growth from the existence of the tubercle diathesis (predisposition)."

Cows seem to be more susceptible to the disease than bulls. Dairy cattle are more often affected than others, particularly those confined in stables in cities and fed with a view of stimulating the flow of milk.

Another factor in the causation of tuberculosis is climatic influence; that is, transporting cattle from a warm climate to a cold.

J. Woodruff Hill says in relation to this: "I have, especially in Alderneys, been a frequent witness of tubercles. A cold atmosphere and especially if it be also damp is almost certain to induce the malady in cattle brought from a warm or mild climate. This has been observed for a long time in other than bovine animals, but Sanson and Reynal draw attention to one striking instance occurring in France. A number of the South Devon breed of cattle was imported to the experimental dairy of St. Angeau, in Auvergne, which is situated at a high altitude; but all these, as well as their progeny (a cross with the Auvergnates), were gradually swept off by phthisis, evidently induced by the unaccustomed cold which they were incapable of resisting. So numerous were the cases of tuberculosis occurring among these animals, that local observers believed the disease to be contagious. Roell also remarks that cattle reared in mountainous districts when transferred to low-lying, damp plains, are very liable to be

affected with tuberculosis. Young animals are more predisposed than old."

*Until 1882 when Professor Koch, at Berlin, published the results of his researches in reference to the cause of consumption, "the contagium," "mórbid material," or "specific causative agent," was a matter of speculation.

He made the startling announcement that the disease was due to a specific micro-organism which he termed bacillus tuberculosis.

He demonstrated that this germ was uniformly present in tuberculous tissues and absent in non-affected tissues and in tissues affected with other diseases. This announcement naturally fixed the attention of the scientific world upon this disease, and much investigation has taken place, which has demonstrated that this germ alone will produce tuberculosis when introduced into the system of healthy animals after it has been freed from all extraneous material by continued cultivation, outside of the body, of several generations.

These facts have practically settled the question of the communicability of the disease. This conclusion has been objected to on the ground that, if the disease was infectious, all of those coming in contact with persons or animals affected with it would contract it, but this is only analagous to other contagious diseases. Many who are exposed to measles, scarlet fever, and even small-pox, do not take the disease. They seem to possess a resistance to the contagium, and it is in relation to this circumstance that predisposition may be said to exist. This predisposition as now defined involves a condition, or conditions, of the body favorable to the development of the bacilli; or, in other words, the soil must be previously prepared for the growth of this germinal seed.

Clinical observation has shown that any cause which tends to lower the vital forces favor the development of the bacilli.

It is found by experience that the failure to produce the disease in fowls is the exception; that the rabbit and guinea pig are the next most susceptible; dogs are the least, and in horses the disease does not occur. These facts are strongly in favor of Dr.

* Berliner Klinische Wochenschrift, April 10, 1882.

Brush's belief, that the reason why man is not as often affected as the cow when he is constantly consuming her flesh and milk, and when such a large percentage of her race are affected, is because man's temperature, which is from 98.5 to 100, is not favorable to the development of the bacillus. This theory is also supported by the established fact that tuberculosis so frequently develops itself immediately after some febrile disease, whose temperature ranges from 101 to 104; namely, the eruptive fevers, especially measles (it is asserted by many observers that ten per cent of the cases of measles are followed by consumption). Whooping cough is oftenest followed by this disease. It also frequently follows after an injury which elevates the temperature; and we have had several occasions to observe the rapid development of miliary tubercles after an attack of pneumonia.

Dr. Brush also claims that the development of the disease, in the domestic animals, is favored by the fact that the temperature in them is that which is favorable to the development of the bacilli of tuberculosis. It is well established that those animals most successfully inoculated with tubercular virus are those whose normal temperature are the highest.

The following list is given as the temperature of the different domestic animals:

Common fowl	106.7
Sheep and lambs, in the field	104.5—104.9
Sheep and lambs, in the stable.....	103.5
Rabbits	103.0
Pigs, at liberty	103.2
Pigs, in sty	101.6
Guinea pigs	108.0
Calves and stirk, in the field or at work.....	101.8
Calves and stirk, in the stable.....	100.9
Cows and oxen, in the field or at work.....	101.8
Cows and oxen, in the stable.....	100.8
Dogs, liberty	101.9
Dogs, under restraint	99.3
Horses, at work or in the field.....	100.3
Horses, in the stable.....	99.2

Dr. Brush found that the temperature in perfectly healthy cows varied greatly, ranging from 101.2 to 103.5 F., and says:

* "From my own observation among cows and the experience as given in books, I find that all the animals endowed with hairy and woolly coats, but without well-developed sudorific glands, that is, that do not sweat readily, do not maintain a uniformity of temperature. The difference between a quiescent condition and one of activity is several degrees without affecting the health. But all these animals have a higher range of temperature than the human species."

Symptoms.

Those in the beginning are often very obscure. Usually the disease has existed for months before any signs become noticeable, and it is a common thing for butchers to find tuberculosis in slaughtered cattle when there had been no suspicion at all that the disease existed, indeed, their general appearance being good in every way.

The first sign noticed is a want of vivacity. The animal is dull and indifferent, there is a slight cough, falling off of the appetite, a roughening of the coat and tenderness over the spine. The cough may be provoked by taking the animal into a colder or warmer atmosphere than she had been accustomed to, or by making her suddenly to undergo exertion, or by pinching the windpipe.

Upon putting the ear over the chest the respiratory murmur will be found to be harsher and louder in some places than in others, and blowing in character. Striking the ribs will cause the animal to shrink and manifest pain by a grunt.

The temperature is slightly raised at times, but is never very high during the progress of the disease till near the close.

In the first stages of the disease the heart beats are rather tumultuous and the pulse is hard. The ears are hot and dry, as is also the skin at the base of the horns. Nose-bleed sometimes occurs.

Generally there is soreness of the limbs, changing from one to the other, causing more or less lameness. There is also, generally,

enlargement of the lymphatic, parotid, axillary (armpit) and inguinal (groin) glands, which sometimes becomes a very prominent feature.

The enlargement of the inguinal gland is considered by some almost characteristic of this disease. Dr. Brush, of Mount Vernon, who has made an exhaustive study of this disease says: "The prominent sign of a suspicion of tuberculosis in the cow is an enlargement of the inguinal gland. Coincidentally with the disposition of tubercular matter in other locations, there is a marked tendency of the lymphatic glands to become focuses of infection. These glands are usually infected in groups — those of the larynx, pharynx, trachea, lung and heart, the abdominal and the inguinal. It is the enlargement of this last-named gland, which can be so plainly observed even by a casual examination, that indicates a tubercular condition. I never have seen a tuberculous cow without an enlarged inguinal gland. Of course, this gland may become enlarged from other causes; but just as we (doctors) feel for an enlargement of the post-cervical glands (back of the neck) in a supposed case of syphilis, so the enlargement of the inguinal gland in the cow must be looked for, and they are just as strong a diagnostic indication of tuberculosis in the bovine race as the post-cervical glandular enlargement is of syphilis in the human race."

The milk is deficient in quality, the proportion of water to solids being increased, and also the proportion of salts to caseine, fat and sugar is decreased. The bowels are usually irregular, and there is not much discharge from the air passages, though exertion may cause a flow of viscid mucus containing flakes of solid matter, towards the latter part of the first stage of the disease. In many cows a strong sexual desire is manifested and they are spoken of as being "bullers." These signs may go on for a longer or shorter period, and sometimes they continue for months, but usually they become gradually intensified and the disease is in its second stage. As it proceeds in its course the emaciation becomes marked, her apathy increases, her hair grows more rough and lusterless, her skin is rough and dry and immovable, and she is

said to be hide-bound. Perspiration shows itself, in places, by dampness of the hair and is easily excited by exertion. The mucus membrane about the mouth and nostrils is of a pale, yellowish color and dropsical.

Pregnant cows nearly always abort.

The cough becomes more constant and harsh and appears to come from deeper regions of the respiratory tract, and is attended with the expulsion of viscid muco-purulent matter, which sometimes contains yellowish white, cheesy looking flakes usually having no odor.

The respiration becomes labored and difficult, the animal at times is almost gasping for breath.

The milk continues to decrease in quality and also becomes less in quantity.

Percussion over the ribs gives dullness in some places and increased resonance in others.

The auscultation gives loud bubbling noises, sometimes dry crackling sounds, mixed with a harsh blowing like that caused by the air passing through the larynx, which indicates a dry bronchial mucous membrane, and the existence of patches of emphysema in different parts of the chest.

The parts most frequently attacked are the anterior portions of apices of the lungs, which may be readily auscultated by carrying the fore limb well back so as to expose the first ribs. The next part most frequently attacked is the middle zone immediately behind the shoulders and as far back as the ninth and tenth ribs. In the upper zone the vesicular murmur is nearly always heard, but in the lower, it is lost.

The tumultuous beating of the heart continues, but the pulse becomes small and weak. The glands mentioned above increase in size, the limbs become affected with hard, painful swellings, causing persistent lameness. High fever and copious sweating sometimes occur at this stage of the disease.

All these symptoms gradually grow more pronounced until the animal presents a most deplorable condition and the third and last stage presents itself.

There is persistent hectic fever, the cow stands with her feet close together, her back raised and her head close to the ground. She breathes with extreme difficulty and frequently groans with expiration, her tongue protrudes, her mouth is open and the angles drawn back, her eyes are sunken and sparkling, shoulder blades stand out prominently, some portions of her chest are contracted, while others are protruding from the excessive formation of tubercles underneath. Her abdomen is pendulous and large, and dropsical effusion has taken place in the limbs and dewlap. Her skin, ears, horns and limbs are cold and clammy. Her temperature rises from 100 degrees to 105 degrees F. The passages are black, loose and offensive, alternating with constipation. The rumen is impacted, which may be felt in the left flank.

Upon auscultation pretty much all the rales will be heard; namely, sibilant, large and small mucous, gurgling, cavernous and amphoric, besides wheezing and grating sounds.

Rarely ulceration of the joints and glands from softening of the swollen texture takes place.

In the latter stage broncho and lobular pneumonia supervene. Pleurisy is sometimes caused by perforation of the serous membrane covering the lung due to the breaking down of the tubercular mass, and produces a fatal termination.

Occasionally the bronchial glands become so enlarged as to cause strangulation by pressure upon the trachea.

The above describes the disease when it predominates in the lungs and their appendages. There are cases when the disease is situated only in the alimentary tract, more especially the lower part of the intestines, giving rise to chronic diarrhoea, which produces death sooner or later by exhaustion or peritonitis from perforation into the peritoneal cavity. The disease may invade and destroy kidneys and liver before it does the lungs, and thus give rise to a modification of the symptoms.

While these are the manifestations in the majority of cases of tuberculosis, there are some striking exceptions. The disease sometimes, from beginning to end, presents no features which would indicate that anything serious was going on in the animal.

Dr. Brush says in this connection: "Tuberculosis is emphatically a bovine disease; this race can be tubercular from birth to old age and yet not die from this disease. It is only when the surroundings, lack of care and other bad hygienic conditions lower the resistance that caseation of the tubercular mass takes place, and the animal dies from sepsis (blood poisoning)."

Then, again, occasionally, after unequivocal symptoms have presented themselves, they subside and are lost sight of until the sudden death of the animal calls them to mind again. A few years ago we were called to see the carcass of a blooded cow, whom the owner had purchased at a high price and who had been a breeder of fancy cattle for years and so not easily deceived, that had died suddenly, without having given any indication that she was far advanced in pulmonary tuberculosis, of which she evidently died. It was remembered, however, when the nature of the disease was made known to the owner that several years previous, when he had owned this animal (he had sold her and re-bought), that she had had some sickness which had emaciated her.

Infectiousness of milk.

When we consider that one-seventh of the human race die of tuberculosis, and that it is asserted by the most reliable investigators that it can be communicated through milk, and as that article is so generally consumed in its raw state, this subject becomes of intense interest. Centuries ago it was strongly suspected by close observers that tuberculosis was a contagious disease. It then became doubtful and was declared by the medical profession that it was not contagious. However, after a time clinical knowledge began to create suspicion again in the minds of close observers which grew in strength up to 1856, when E. Buhl* put forth his view to the effect that milinary tuberculosis was an infective disease due to a specific virus which he considered to be the cheesy material resulting from previous inflammation. The primary inflammation might be of any nature whatever producing cheesy formations. But the first

* Lungeneutzündung, Tuberkulose und Schwindsucht, 1872, iii.

experimental knowledge of any great importance was that of Villemin's in 1865 of inoculating animals with tuberculous matter. This was successful and has been repeated by many others. At about the same time it was demonstrated that the tuberculosis of cows, called by the Germans *perlsucht*, was identical with the same disease in man. This was also demonstrated experimentally. We, in the first annual report of the New York State Dairy Commission, gave abstracts of these early experiments in this relation. The disease could be produced from any part of the tuberculous matter, such as the cheesy products, etc. Klebs, in 1877, stated that he had discovered the germ, micrococci, which produced tubercles when injected into animals. Several others, Schneller, Aufrecht, Gerlach, confirmed the statement of Klebs, but it was not until 1882 when Koch discovered the true infectious material, namely, *bacillus tuberculosis*.

The scientific world has accepted the doctrine of Koch, namely, that the tubercle bacillus is the specific cause of tuberculosis, and without it there is no such disease.

The methods by which the disease is spread, by which the virus is carried from person to person, are through the excreta, more especially the sputum, from persons affected by the disease. These sources of infection have long been recognized, but propagation arising from the ingestion of food material, especially the milk and flesh of cattle, is of recent date. Gerlach was one of the first to experiment in producing the disease from milk, and it was generally accepted, up to within a year or two, that unless the cow's udder was diseased, there was no danger of infection from her milk. Koch, himself, says in relation to this:* "Since by far the greater number of cases of tuberculosis begins in the lungs, it is not to be supposed that the infection in all these cases has taken place in the manner just suggested by the inhalation of phthisic sputum dried and made into dust. The second principal source of the tubercle bacilli, viz., tuberculosis of the domestic animals, appears not to have anything like the importance of the phthisic sputum. The animal, as is well known, pro-

§ *Etudes sur la Tuberculose*, Paris, 1868, 528.

* Quoted by Ernst in the *Transactions of the Association of American Physicians*, volume 4, page 268.

duces no sputum, so that during their life no tubercle bacilli get from them into the outer world by means of the respiratory passages. Also, in the excrement of tuberculous animals, the bacilli appear to be only exceptionally present. On the contrary, it is a fact that the milk of tuberculous animals can cause infection.

"With the exception of this one way, therefore (i. e., through milk), the tuberculous virus can only have effect after the death of the animal, and can only cause infection by the eating of the meat. The same can hold for the milk of cows suffering from 'perlsucht.' Before all things, if infection is to take place, it is necessary that the milk contain tubercle bacilli; but this appears to be the case only when the milk glands themselves are affected with the disease. This explains at once the contradictions in the statements of the various authors, who have made feeding experiments with the milk from cows suffering from 'perlsucht.' If infection from tuberculous animals does not appear to be frequent, it must by no means be underrated."

This statement of Koch's has been shown to be erroneous as there has been numerous cases, even before Koch wrote this, of convincing proof that the disease had been produced from the milk of cows whose udders were free from any apparent disease.

The following is taken from Ernst, bearing on this point: * "The gentleman writing it (the letter) is a veterinarian in practice in Providence, R. I., and the observations were made and the advice given more than ten years ago. That portion of his letter bearing upon the subject in hand is as follows:

"Mr. W., June 15, 1878, called me to see a white and red cow. Coughs, and was short of breath and wheezes; pulse, 60; respiration, 14, and heavy at the flanks; temperature, 104. Diminished resonance of right lung, but increase in part of same.

"The veterinarian pronounced the case one of tuberculosis and advised that the cow be destroyed. She was not destroyed and the family continued to use her milk as long as she yielded any, which was up to within three weeks of her death.

"The doctor examined her from time to time from June 15, 1878, to May 30, 1879, when she died.

* Trans. Asst. Amer. Phy., Vol. 4, p. 264.

"Post mortem examination showed the various internal organs to be infiltrated with tubercles, and, also, a deposit of tubercles in the udder.

"In the following August a baby of the family was taken sick and died of a tubercular affection.

"In 1881 another child, 3 years old, died from the same cause; and in 1886 another died of consumption, 9 years old, who had been suffering for three years.

"So far as known the family on both sides have never before had any trouble of the kind, and the parents were both rugged and healthy people, and so were the grandparents, one now being alive and 68 years old, and the other died at 78."

Prevalency of the Disease.

The lack of reliable statistics makes it impossible to arrive at anything like accuracy in determining the extent to which this disease exists; but the reports from various parts of foreign countries, such as Italy, Holland, Germany, France, Mexico, England, etc., make it certain that it prevails to a great extent. It is asserted that one-sixth of the milch cows in this State are tuberculous. This assertion is no doubt true in the main, but should be made only with this important modification; that while the cows in and near large cities are affected in a much higher ratio — even above fifty per cent in some — yet our observations lead us to believe that in the country districts where the great majority of dairy cows are kept, nothing like this ratio exists.

There are however occasional exceptions to this latter statement, as the following will show: During this summer (1891) we were sent into one of the northern counties of New York State to examine a herd of cows alleged to be infected with tuberculosis. The herd consisted of twenty-one cows (natives) and eleven were found to be tuberculous, three were in an advanced stage and the rest in the initiatory, but all presenting unequivocal signs of the disease.

In this case the disease had been introduced into the previously healthy herd by a bull which had been imported from England a few years before.

The Remedy.

This aspect of the subject presents more difficulties than any other. The most rapid and effective remedy would be the immediate destruction of all tuberculous animals, and the isolation and non-usage of all those showing a strong tendency. But this would throw a very heavy burden upon the dairyman unless he was fully compensated, in which case the burden would be transferred to the government. But more of this later on.

We believe that this disease can be wiped out, in a much less rapid way to be sure, but as effectually, by removing the prominent factors in the causation. In the first place, care should be taken not to introduce the disease through the agency of the bull. See that the cow is healthy at the time of her introduction into the herd; then, as soon as the first sign of the disease appears, isolate her, disinfect her stall and all her surroundings.*

As to curative means, much has been said and done within the last few years, especially the last two. Many methods have been brought forward, each promising much in the hands of its discoverer, but none so far have fulfilled the great "desideratum." The following are some of the very recent methods and their present status:

The Bergeon Method.—Dr. Bergeon, of Lyons, introduced the process of injecting large quantities of carbonic acid gas intermixed with a small percentage of pure sulphuretted hydrogen gas (accompanied by passing the carbonic acid gas through a bottle containing Eaux Bonnes, a sulphur water in the Pyrenees) into the intestines. This gas is rapidly taken into the system through the intestinal veins, and passing through the lungs is exhaled through the breath. It has been stated that the sulphuretted hydrogen gas can be detected in the expired air in two or three minutes after the injection.

The abdomen is greatly distended by the gas but no harm or discomfort is felt except the gases contain impurities, or atmospheric air is allowed to enter.

Dr. Bergeon says, after the treatment of 200 cases of phthisis in

* Since writing the above, our experience has taught us that in the present state of knowledge of the ordinary dairyman regarding this subject, nothing short of paying for and destroying the diseased animals would be effective.

human beings: "Early phthisis, even in general acute phthisis (a form of the disease nearly always fatal), in two or three weeks there is generally an arrest, and in a few months a cure. Even in advanced, incurable phthisis, great amelioration is obtained. The pulse is lower, the temperature falls, the night sweats cease, the appetite returns, the expectoration rapidly diminishes, losing its purulent character, and the cough becomes less harassing and frequent. The amelioration is also rapidly obtained in advanced laryngeal phthisis, when all local or constitutional treatment has failed to give ease, or to arrest the ulcerative process."

*Others have reported cures by this method, even in advanced stages of the disease.

Dr. Bergeon does not claim that the benefits of his method are due to the destruction of the tubercle bacilli, but A. B. Griffith, Ph. D.,§ shows sulphuretted hydrogen to be a powerful germicide. He prepared the gas in the same manner as Bergeon, then allowed it to pass into a pure cultivation of bacillus tuberculosis. After all the gases had passed through the cultivation, the tap was turned off. Ten tubes containing sterilized blood serum were inoculated with the growths which had been submitted to the action of the gases. The tubes so inoculated were subsequently placed in the incubator at a temperature of 37 degrees C. After forty days incubation, no signs of any growths made their appearance in any of the tubes. These experiments were repeated a second time with similar results.

This experimenter destroyed the virulence of sputa from consumptive patients, by passing the gas through them, and finally states: "From the above experiments there is every reason to conclude that Bergeon's gaseous enemata destroys bacillus tuberculosis and its spores."

Bergeon's method has been applied to different animals but whether to bovine species or not we have no knowledge.

Dr. Kolischer, of Vienna, proposed treating phthisis by producing artificial calcination, by means of hypodermic injection of calcium phosphoricum.

This treatment is based upon the fact that tubercles sometimes

* Dr. McLaughlin, Philadelphia Hospital.

§ Researches on Micro-Organism, etc., 1891, p. 304.

undergo calcareous degeneration, and the calcined tubercle remains as an inert foreign substance. It is claimed that every experiment turned out successfully. Griffith says of this: "Kolischer's method is of value, and, in certain stages of the disease, ought to be tested by medical authorities."

Dr. Ball* claims cures from the injection of eucalyptus oil, hypodermically, for the purpose of destroying the bacilli.

Weigert's method is to cause the patient to breathe hot, dry air for the purpose of destroying the tubercle bacilli. This was used extensively abroad a couple of years ago, but, while the symptoms were relieved in the early stage of the disease, no satisfactory results were obtained. This treatment was based upon the fact that tubercle bacilli grow only in temperatures of eighty-six degrees to 105.8 degrees F. Hence it was stated by Griffith that "it is possible that, in Weigert's treatment, the microbes, if not actually destroyed, became inactive." Within the past year this method has been advocated by Krull, and others, and finally condemned.

Griffith's method consists of injecting natural salicylic acid under the skin. From five to twenty minutes of a warm saturated solution of the acid should be injected, if possible, twice a day, though the number of injections is left to the discretion of the physician.

Dr. Griffith§ says: "Natural salicylic acid has no detrimental action on the blood and tissues, and appears to be curative of local lesions. It certainly arrests the development of the microbes, and ultimately destroys them.

"During the salicylic acid treatment the night sweats disappear, the breathing gradually becomes less labored, the appetite returns, and the sputum becomes thinner and thinner, and ultimately disappears. The body-weight increases as well as the measurement of the chest."

He reports the amelioration by this treatment of a case of long standing, in reference to which he says: "In the case of Mr. Snodgrass, the author constantly reported the microscopical

* Bulletin de l'Académie de médecine, 1887.

§ Micro-Organisms, p. 318.

appearance of specimens of sputa received from him, and it was surprising to note, from time to time, the decreasing number of bacilli present. Not only do the bacilli decrease, but also the quantity of cellulose in the sputum, showing the inactivity of the bacilli present. In fact, their pathological power appears to be proportional to the quantity of cellulose found in the sputum."

He also relates the results of the treatment obtained by two other physicians, who report cures of well-established cases, and decided improvement in well-advanced cases.

Dr. Griffith insists upon the hypodermic use of this drug, and, also, the use of the natural salicylic acid; that is, that obtained from the vegetable kingdom.

Salicylic acid has long been known to be a powerful germicide, and if it can be tolerated by the system, as Dr. Griffith asserts, we would expect some striking results from its use. But in two cases which we faithfully treated by this method, we obtained indifferent results.

Creosote has been used by Sommerbrodt, who claims that the disease, in the initial stage, can be cured by creosote, and greatly relieved in the later stages. But it was not until very recently that a "new discovery" of its virtues was brought out* by Germain See, Paris, which causes the patient's body, except the head, to be placed in a chamber. This portion of the body is covered with bandages saturated with a solution of creosote, and a pressure of an atmosphere and a half brought to bear upon it, for the purpose of increasing absorption; favorable results are claimed.

"Koch's lymph" has created a greater interest and hope in the minds of the populace than any other discovery in the domain of medicine within the last century.

In 1890 this discovery was made known in a paper read by Koch at the first general session of the tenth international congress, at Berlin, August 4, 1890. He briefly reviewed the endeavors which had been made to cure this disease and stated that the previous failures were due to the fact that they had been

* Medical Record, May 8, 1891, p. 519.

aimed at the disease instead of the cause; consequently they had been found to be illusive.

He found, in his experiments, that many substances, such as ethereal oils, aromatic compounds, coal tar products, mercurial vapor, and, especially, Cyanide-of-gold compounds, would arrest the growth of tubercle bacilli in a test tube, when used in very minute quantities, as little as .000002 parts; but all of which proved inert when tried on tuberculous animals. The substance which he discovered, and claimed proved to be efficacious, is known as Koch's lymph. It is an extract made from the culture fluid in which the bacilli are grown. Koch describes it as follows:*

"The remedy is a brownish, transparent liquid, which does not require special care to prevent decomposition. For use, this fluid must be more or less diluted, and the dilutions are liable to undergo decomposition if prepared with distilled water. As bacterial growths soon develop in them they become turbid, and are then unfit for use.

"To prevent this, the diluted liquid must be sterilized by heat and preserved under a cotton-wool stopper, or, more conveniently, prepared with a one-half per cent solution of phenol.

"It would seem, however, that the effect is weakened both by frequent heating and by mixture with phenol solution, and I have, therefore, always made use of a freshly prepared solution. Introduced into the stomach, the remedy has no effect. In order to obtain a reliable effect it must be injected subcutaneously, and for this purpose we have exclusively used the small syringe suggested by me for bacteriological work. It is furnished with a small India-rubber ball, and has no piston. This syringe can easily be kept aseptic by the use of absolute alcohol, and to this we attribute the fact that not a single abscess has been observed in the course of more than a thousand subcutaneous injections.

"The place chosen for the injection, after several trials of other places, was the skin of the back between the shoulder-blades and the lumbar region, because here the injection led to the least local reaction — generally none at all — and was almost painless. As regards the effect of the remedy on the human patient, it was clear

* *Sajous*, Vol. 1, p. A-14.

from the beginning of the research that in one very important particular the human being reacts to the remedy differently from the animal generally used in experiments, namely, the guinea-pig, a new proof for the experimenter of the all-important law that experiment on animals is not conclusive, for the human patient proved extraordinarily more sensitive than the guinea-pig. As regards the effect of the remedy, a healthy guinea-pig will bear a subcutaneous injection of two cubic centimetres (32 1-2 minims), and even more, of the liquid without being sensibly affected, but, in the case of a full-grown, healthy man, 0.25 cubic centimetres (4 minims) suffices to produce an intense effect. Calculated by the body-weight, one-fifteen thousandth part of the quantity which has no appreciable effect on the guinea-pig acts powerfully on the human being.

"The symptoms arising from an injection of 0.25 cubic centimetres (4 minims), I have observed after an injection made in my own upper arm. They were briefly as follows: Three to four hours after the injection there came on pain in the limbs, fatigue, inclination to cough, difficulty of breathing, which speedily increased in the fifth hour, and were unusually violent. A chill followed, which lasted almost an hour. At the same time there were nausea, vomiting and a rise of body temperature to 30.6 degrees C. (103.2 degrees F.)

"After twelve hours all these symptoms abated, the temperature fell, and on the next day it was normal. A feeling of fatigue and pain in the limbs continued for a few days, and for exactly the same period of time the site of injection remained slightly painful and red. The smallest quantity of the remedy which will affect the healthy human being is about 0.01 cubic centimetre (one-sixth grain), equal to one cubic centimetre (16 1-4 minims) of the one-hundredth dilution. As has been proved by numerous experiments, when this dose is used, reaction in most people shows itself by slight pains in the limbs and transient fatigue. A few showed a rise of temperature to about 38 degrees C. (100.4 F.).

"Although the effect of the remedy in equal doses is very different in animals and in human beings, if calculated by body-weight, in some other respects there is much similarity in the

symptoms produced, the most important of these resemblances being the specific action of the remedy on the tuberculous process, the varieties of which I will not here describe. I will make no further reference to its effect on animals, but I will at once turn to its extraordinary action on tuberculosis in human beings. The healthy human being reacts either not at all or scarcely at all, as we have seen, when 0.01 cubic centimetre (one sixth minimum) is used. The same holds good with regard to patients suffering from diseases other than tuberculosis, as repeated experiments have proved; but the case is very different when the disease is tuberculosis.

"A dose of 0.01 cubic centimetre (one-sixth minim) injected subcutaneously into tuberculosis patients, causes a severe general reaction as well as the local one."

Numerous cures of incipient cases were reported by Koch, and others have reported like results. Many, on the other hand, have reported failures, some obtaining even evil results. But this is not to be wondered at when we take into consideration the want of knowledge of the remedy itself. In all these experimentations animals were first used, but we have no records at our command of experiments upon the bovine race, with these remedies; we fear, however, but that little has been done in this line on cattle.

While there is a rebound from the great expectancy at first entertained from Koch's discovery, still there is hope in the mind of the medical profession that it will yet fully gratify the expectation. Thus it is seen that at present little reliance can be placed upon curative measures. Much, however, can be obtained from preventive measures.

There has been a series of experiments lately carried on by Grancher and Martin* for the purpose of creating a power of resistance against the growth of tuberculosis bacilli in the body by inoculating with a tubercular culture, prepared from tubercular material taken from the body of animals which have died of the disease.

These cultures were diluted to different degrees and injected at intervals into the veins of healthy rabbits, beginning with the

* London Lancet, August 13, 1890.

weakest dilution and ending with the most virulent (in a similar manner to Pasteur's method of inoculation against hydrophobia, and Dr. Willen's§ method, which he claims has proved efficacious against pleuro-pneumonia). * "It was found that after a time the animals developed a power of resistance which varied amongst different ones, but in most was of a kind to repel fatal infection from a virus so lethal that fresh animals inoculated with it succumbed in a short time to what was proved, post-mortem, to be tuberculosis. For instance, seven rabbits were inoculated on December 31, 1889, with an extremely virulent preparation. Of these one had not undergone any previous inoculation with the attenuated virus, and it died twenty-three days afterward of the communicated disease; five of those which had been subjected to, and thus protected by, anterior inoculation, lived 126, 176, 176, 184 and 189 days, respectively. As to the sixth, it is even now living, 229 days after the operation. In conclusion, Grancher and Martin claim to have proved that, on the one hand, it is possible by inoculation to evoke in the animal economy a prolonged resistance to the most rapid and fatal form of communicated tuberculosis, and on the other to confer against infection by this disease an immunity, the duration of which, however, remains to be determined.

"They add that the results obtained by Koch, on guinea-pigs, having been achieved by methods somewhat different, give ground for hope that the day is not far distant when we shall have at our disposal more than one way of effectually combating the tubercular bacillus."

The long habit of breeding in-and-in, which is believed by Doctor Brush, and others, to be the most active cause in keeping up the prevalency of the disease, should be stopped at once, and the healthiest and most robust of our present breeds crossed with those animals of known immunity from the disease, and until breeders do recognize the fact that it is more essential to breed for health than for large quantities of milk we will not be on the sure road to get rid of this fell scourge. I am in such

§ See Willen's conclusions, given by Wm. Williams. Principles and Practice of Veterinary Medicine. 1898. Page 189.

* Sajous, p. A25.

perfect accord with Doctor Brush in this matter that I quote him again. After showing that cattle, existing in various parts of the world, which are not bred with close consanguinity, are not tuberculous, he sums up as follows:

* "I am very firm in my conviction that cattle can be bred in such a manner that they will be neither scrofulous nor tuberculous, and in these respects not dangerous to the human race. After due deliberation and serious study, both as a physician and as a cattle breeder, I am firmly of the opinion that the blessings conferred upon us by the bovine tribe far outweigh the burden of the disease which they have entailed on us. When I read of countries that have no tuberculous food-producers, and consequently enjoying a total immunity from this disease, I remember at the same time that they suffer from still more grievous afflictions, both from the lack of the food furnished us and from the presence of disease in some form derived from their own cattle.

"If it were impossible to improve our domestic cattle, in regard to their own and our health, I should, I repeat, be in favor of letting the matter rest as it is. Deeming it, however, quite possible to breed our animals without any scrofulous taint, and, in lieu of the burden of disease, assume the burden of a heavier financial expense, I earnestly urge a reform.

"The foremost cattle breeders have aimed at producing an artificial animal, capable, when bred for beef, of early maturity and early fecundity, and, when bred for the dairy, all other considerations were made subsidiary to an abundant flow of milk. It would appear to these men abject foolishness to breed an animal for strength, health and robustness with a smaller yield of milk. They would not deem it an improvement to breed an animal that did not mature early, and whose dam would not produce a calf till she was three years old. But only by this method can we stamp out tuberculosis in our beef and dairy animals, and I am convinced that legislative action will be necessary to keep the breeders in this line, for it is one of the hardest things in the world to upset a recognized commercial system.

* On the Coincident Geog. Distribution of Tuberculosis and Dairy Cattle.

"Thus the question is focused: 'Are we willing to pay more for beef and dairy products, and throw off the incumbrance of disease, or let the matter remain as it is—an abundant supply of cheap milk and cheap beef?'"

Then while we are endeavoring to create a healthy stock we must not neglect the means of preventing the development of the disease in those animals now free from it. As has been intimated in treating of the causation, the disease may be avoided, even in those which are strongly predisposed, by a careful attention to their hygienic care, and, also, it was stated that the predisposition might be acquired in cattle with no original tendency by inattention to hygiene.

The practice of exposing highly sensitive cows (made so by breeding) to all sorts of weather, cold especially, is as injurious, in our opinion, as shutting them up into poorly-ventilated rooms; both of which practices have come under our notice, more often by far, the former.

The practice of keeping milch cows in barns and outhouses in large cities should be guarded with the utmost vigilance, for here it is that the most favorable conditions for developing the disease in the animal exist. This is usually done in the lower and most unsanitary parts of the city, where the drainage is poor, at best, and by people who are wholly ignorant of the laws of health.

Cows should have plenty of good air and sunlight and a moderate amount of exercise. They should be fed nothing but wholesome food and not overfed. They should not be milked steadily for long periods, neither should they be made to bear young too frequently nor kept for milking till they become enfeebled from age. As soon as a cow begins to show a weakness of health she should be allowed to "dry-up."

It has been shown beyond serious doubt that tuberculosis is a contagious disease and ought to be included as such in the laws governing contagious diseases of cattle. It is much more dangerous to the human race than contagious pleuro-pneumonia; for with that disease the secretions of milk is arrested in its early stages, and it is not so insidious in its invasion and course, as is so often the case with tuberculosis.

Asbestos as an Absorbent in Milk Analysis.

In the second annual report of the New York Agricultural Experiment Station (1884, page 163) Dr. Babcock first described the employment of asbestos as an absorbent in milk analysis. His method consisted of placing in an ordinary test-tube, ten centimeters long and two centimeters wide with a small hole in the bottom, a tuft of clean cotton; over which thoroughly ignited asbestos was closely pressed in to fill the tube about three-fourths full, when another tuft of cotton was placed over this.

The tube and its contents were weighed, the upper tuft of cotton carefully removed and five drams of milk, previously weighed in a pipette, run into it and the cotton returned to its place.

The water was then evaporated in an oven at 100 degrees centigrade, aided by drawing air through the tube by means of a pump.

After being dried to a constant weight, which required about two hours, the fat was extracted with a Soxhlet extraction apparatus.

He stated that "in more than 100 determinations of fat in milk, it had not been necessary to filter a single one before drying."

The ash was obtained by placing the asbestos containing the dried residue into a platinum dish and burning at a low red heat.

Dr. Babcock also recommended its use for the same purpose by placing two grams of it in the bottom of a platinum dish and proceeding with the analysis in the usual way, of course, the organic matter was all first burned out of the asbestos before the milk was put upon it.

H. W. Wiley, chemist of the United States Department of Agriculture, experimented with placing the milk upon long strips of asbestos paper, in reference to which he says: "I have not yet secured an asbestos paper sufficiently bibulous to make this method completely successful. But it has the advantage of being very speedy, since on so large a surface exposed for two or three minutes with temperature of 100 to 105 degrees C., over a sand bath, the water is completely evaporated."

Professor MacFarlane uses a glass tube four to five centimeters in length and two centimeters in diameter. One end is open and

the other is drawn out into a tube of five millimeters in diameter. The tube is filled two-thirds full with a peculiar loose asbestos fiber used in manufacturing packing. After the asbestos is thoroughly dried in the water bath and properly cooled, and the tube and asbestos weighed, ten cubic centimeters of milk are run on to the asbestos from a pipette when it is weighed again, the increase representing the amount of milk taken. The tube is then placed in a water bath arranged with a feeder to maintain constant level and allowed to remain over night at a temperature of 90 degrees C. Constant weight being obtained, the water is determined by loss. The fat is then extracted in a Soxhlet apparatus with petroleum ether. This requires about four hours. After being dried in a steam bath and weighed, the fat is also determined by loss.

The Babcock & MacFarlane method are recommended as "alternative methods" for determining water and fat in milk by the "association of official agricultural chemists."*

Professor S. A. Lattimore of the University of Rochester, N. Y., uses practically the same tube as MacFarlane, though with a modified extraction apparatus (see seventh annual report New York State Dairy Commissioner, 1890, page 291), and also dries by drawing hot air through the tube by means of a pump.

Professor Caldwell also uses asbestos as the absorbent in a modified form of tube for determining percentage of water and fat.

The following table gives the comparative results of the analysis of three samples of milk obtained by the use of asbestos, and by the use of the paper coil. The analyses were made by H. Snyder, assistant of Professor Caldwell's:

	Asbestos.	Paper.		Asbestos.	Paper.
	Per cent.	Per cent.		Per cent.	Per cent.
Fats.....	3.96	3.88	Solids.....	13.39	13.37
Fats.....	4.27	4.24	Solids.....	13.16	13.24
Fats.....	3.77	3.73	Solids.....	12.80	12.91

* Proceed, 6th Annual Con. p. #13.

We compared the results obtained by the use of asbestos in the bottom of a dish, with those obtained by the use of Adam's paper coil, and the ordinary platinum dish without any absorbent, which are given in the following table:

NUMBER.	Fat from dish partly filled with asbestos.	Fat from paper coil.	Fat from dish containing no asbestos.	Solids from dish containing asbestos.	Solids from dish containing no asbestos.	Water from dish containing asbestos.	Water from dish containing no asbestos.	Ash from dish containing asbestos.	Ash from dish containing no asbestos.
	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.
1	4.65	5.20	4.43	15.06	14.87	84.94	85.13	.74	.72
2	2.82	3.82	3.43	12.01	11.88	87.99	88.12	.73	.70
3	3.47-3.57	4.13	3.63	13.40-13.40	13.28-13.28	86.60-86.60	86.72	.62-.59	.60
4	3.35-3.66	4.08	3.42	13.19-13.18	13.07	86.81-86.82	86.93	.71-.71	.68

We stated a year ago in the seventh annual report of the New York State Dairy Commissioner that the use of asbestos would be preferable to paper; for, by employing a metallic tube the analysis could be made continuous and thus save much time and labor. We have experimented with the use of such tubes as far as our limited time would permit; yet, though incomplete and unsatisfactory as the results so far are, we are convinced that with the proper form of tubes and asbestos the object desired can be obtained. We have found that our tubes will not contain sufficient coarse asbestos to absorb five grams of milk without being packed in so tightly as to make the absorption and drying tedious and the burning off of the organic matter impossible.

In using the short fibered asbestos we have found that, after being thoroughly ignited, it became so brittle that in the extraction with ether fine particles would wash out with the fat in spite of the use of a tuft of fine, long-fibered asbestos placed over a fine platinum gauze.

The most satisfactory results were obtained by rolling up thin asbestos paper into a coil as large as the tube would admit, placing it into the tube, and, after burning off all organic material, dropping the milk upon it.

The amount of paper we were allowed to use by the small size of our tubes would not absorb but about three grams of milk. The following table gives the result of analyses by the use of asbestos and the metallic tube as compared with the paper and Wanklyn-Waller methods:

COMPARATIVE ANALYSES OF MILK BY THE WANKLYN-WALLER AND ADAM'S METHODS AND BY THE USE OF
ASBESTOS IN A PLATINUM TUBE.

NUMBER.	PER CENT WATER.		PER CENT SOLIDS.		PER CENT FAT.			SALTS.		DIFFERENCE.				
	From dish.	From tube.	From dish.	From tube.	From coll.	FROM TUBE.		From dish.	From tube.	Water.	Solids.	FAT.		Salts.
						By loss.	By weight.					By loss.	By weight.	
1.....	{ 88.62	88.79	11.88	11.21	3.36	3.45	3.88	0.626	*	0.17	0.17	0.09	0.02	{ 0.375
	{ 88.59	88.99	11.41	11.01	3.34	3.84	3.25	0.518	0.173	0.40	0.40	0.00	0.09	{ }
2.....	{ 89.67	89.57	10.33	10.43	2.94	3.15	3.04	0.566	0.150	0.10	0.10	0.21	0.10	0.416
	{ 89.71	89.66	10.29	10.34	2.89	3.14	3.01	0.564	0.330	0.05	0.05	0.25	0.12	0.234
3.....	{ 87.82	87.88	12.68	12.62	3.83	3.84	3.72	0.670	0.303	0.06	0.06	0.01	0.11	0.367
	{ 87.34	87.36	12.66	12.64	3.85	3.78	3.75	0.811	0.431	0.02	0.02	0.07	0.10	0.380
4.....	{ 88.16	88.06	11.84	11.94	3.82	3.88	3.85	0.620	.....	0.10	0.10	0.06	0.03	.....
5.....	{ 87.00	86.85	13.00	13.15	4.64	4.68	4.62	0.647	.....	0.15	0.15	0.04	0.02	.....
	{ 86.85	{ 86.28	{ 13.15	{ 13.72	{ 4.02	{ 3.86	{ 3.76	{ 0.637	{ 0.444	{ 0.57	{ 0.57	{ 0.16	{ 0.26	{ 0.198
6.....		{ 86.22				{ 3.90	{ 3.85		{ 0.524			{ 0.12	{ 0.17	{ 0.113

* Weighed less than tube + asbestos without ash.

The following bibliography was prepared by F. P. Vandenberg, B. S., M. D., one of the chemists of this department, at our request:

A Contribution to the Bibliography of Dairy Products.

BY F. P. VANDENBERGH, B. S., M. D., BUFFALO.

The record of progress in the chemistry of dairy products, and in fact, agricultural chemistry in general, is now chiefly to be found in the reports of the State Dairy Commissioners and the bulletins published by the Agricultural Experiment Stations, with occasional articles of value in the *Journal of Analytical Chemistry* and the *Analyst*. Although the literature is, in the main, confined to so small a class of publications, the total number of references is still quite great.

The following list of references has been gleaned from these and a few other publications, and placed in form for reference:

The articles on composition and analysis are of special interest, because they record the experience of analysts in different parts of this country and Canada, also England, where the subject of milk analysis is a fertile and never ending topic of discussion. Some of the articles on the value of cattle food, and the results of feeding experiments, will be found of interest by the expert witness, who is so often catechised, as to the possible means of producing a milk below the standard by abnormal conditions of food or hygiene.

The comprehensive bibliography of Moore, published in the report of the New York State Dairy Commissioner for 1889, and the abstract of chemical literature relating to the dairy products published in the seventh annual report of the Association of Official Agricultural Chemists, render a complete resume of the literature unnecessary at this time; but the following specific references to recent articles will supplement these reports and bring the record down to date.

CATTLE FOODS — FEEDING EXPERIMENTS, ETC.

Ensilage in dairy farming; G. W. Witcher, N. H. Bull. No. 14, May, 1891.

Effect of food upon milk; G. W. Witcher, N. H. Bull. No. 9, February, 1890.

Effect of food upon the quantity of milk; G. W. Witcher, N. H. Bull. No. 13, May, 1891.

Effect of a grain ration on cows in pasture; I. P. Roberts, H. H. Wing, Cornell Bull. No. 17, November, 1890.

Effect of heavy feeding on the quantity and quality of milk; also effect of succulent food on the churnability of milk; J. L. Hills, W. W. Cooke, Vt. 4th An. Rep., 1890.

Test of dairy cows, home v. fair grounds; J. L. Hills, Vt., Bull. No. 22, October, 1890.

Comparative test of cows; N. Y. Bull. No. 23, September, 1890.

Analyses of milk from different breeds of cattle; Wis.

Milk from different breeds of cattle; S. M. Babcock, Wis. 7th Rep., 1890.

Dairying and breeding; Isaac Ross, Ala. Bull. No. 24, February, 1891.

Milking two or three times a day; J. L. Hills, Vt. 4th An. Rep., 1890.

Dairy notes; E. F. Ladd, N. Y. An. Rep., 1890.

Effect of food on butter; A. H. Wood and C. L. Parsons, N. H. Bull. No. 13, May, 1891.

Effects on butter from feeding cottonseed and cotton-seed meal; from Ala. Exp. Bull.; N. T. Lupton, analyst, August, 1891.

Comparison of dairy breeds of cattle with reference to the production of butter; Peter Collier, director, N. Y. Bull. No. 34.

Observations on the milk of different breeds; U. S. Exp. Record, March, 1891.

PATHOLOGY AND GENERAL HYGIENE.

Milk fever; Frederick E. Rice, R. L. Bull. No. 6, March, 1890.

Milk from tuberculous cows; H. B. Ryder, consul to Copenhagen, May 8, 1891, U. S. Consular Report.

Milk from tuberculous cows; Science, July 31, 1891.

Sterilized milk; Dietetic Mag., July 31, 1891.

Bacteria in normal and abnormal milk; L. Adametz, U. S. Exp. Record, May, 1891.

Sterilized milk, sanitary inspector, April, 1890.

Directions for sterilizing milk; Walter Mendelson, Western Druggist, August, 1891.

Hygienic advantage of sterilized milk; Mary Hinman Abel and Ellen H. Richards, *Proc. of Am. Associat. for Advan. of Science*, 1890.

Infantile infection from tuberculous milk; sanitary inspector, April, 1890.

Sterilized milk; Board of Health Rep., Maine, 1890.

Effects of heat upon milk and sterilized milk; Dr. Albert R. Leeds, in report of State Dairy Commissioner of N. J., 1890.

TREATMENT OF MILK FOR CREAMERIES AND CHEESE FACTORIES.

Cream raising by dilution; Henry H. Wing, *Cornell Bull.* No. 29, July, 1891.

Cream raising by dilution; Henry H. Wing, *Cornell Bull.* No. 20, September, 1890.

Effect of a delay in setting, on the efficiency of creaming; Henry H. Wing, *Cornell Bull.* No. 29, July, 1891.

The relation of fibrin to the effectual creaming of milk; Henry Snyder, *Cornell Bull.* No. 29, July, 1891.

Cream raising by dilution; G. E. Morrow, E. H. Farington, *U. S. Exp. Record*, March, 1891.

Cream industry (cream raising, testing, etc.); W. Va. *Bull.* No. 13, January, 1891, John A. Myers.

Cheese instructors; M. T. Morgan, in report of State Dairy Commissioner, N. Y., 1891.

Notes for cheese-making in May; notes for cheese-making in July, August and October; J. C. Chapais, in report of Dominion Dairy Commissioner, Canada, 1890.

Creameries on the centrifugal separator plan; J. W. Robertson, *Can. D. Bull.* No. 11, 1891.

By-laws, rules and regulations for creameries; James W. Robertson, *Can. D. Bull.* No. 10.

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At what degree of acidity does milk curdle in boiling? *Analyst*, October, 1891.

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The influence of milk preservatives; A. W. Stokes, Analyst, July, 1891.

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Fibrin in milk; Farmers' Bull. No. 2.

Fibrin in milk; S. M. Babcock, U. S. Exp. Record, March, 1891.

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The constitution of butter; J. Alfred Wanklyn, J. S. C. I., February, 1891.

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Optical analysis of butter; C. Violette, U. S. Exp. Rec., March, 1891.

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Official methods of analysis; 7th An. Rept. of Official Agricultural Chemists, 1890.

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Analysis of butter and other fats; J. Konig and F. Hart, Analyst, July, 1891.

Notes on analyses and composition of butter fats; W. Johnston, Analyst, February, 1891.

Remarks on analysis and composition of butter fats; O. Hehner, Analyst, March, 1891.

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Respectfully submitted.

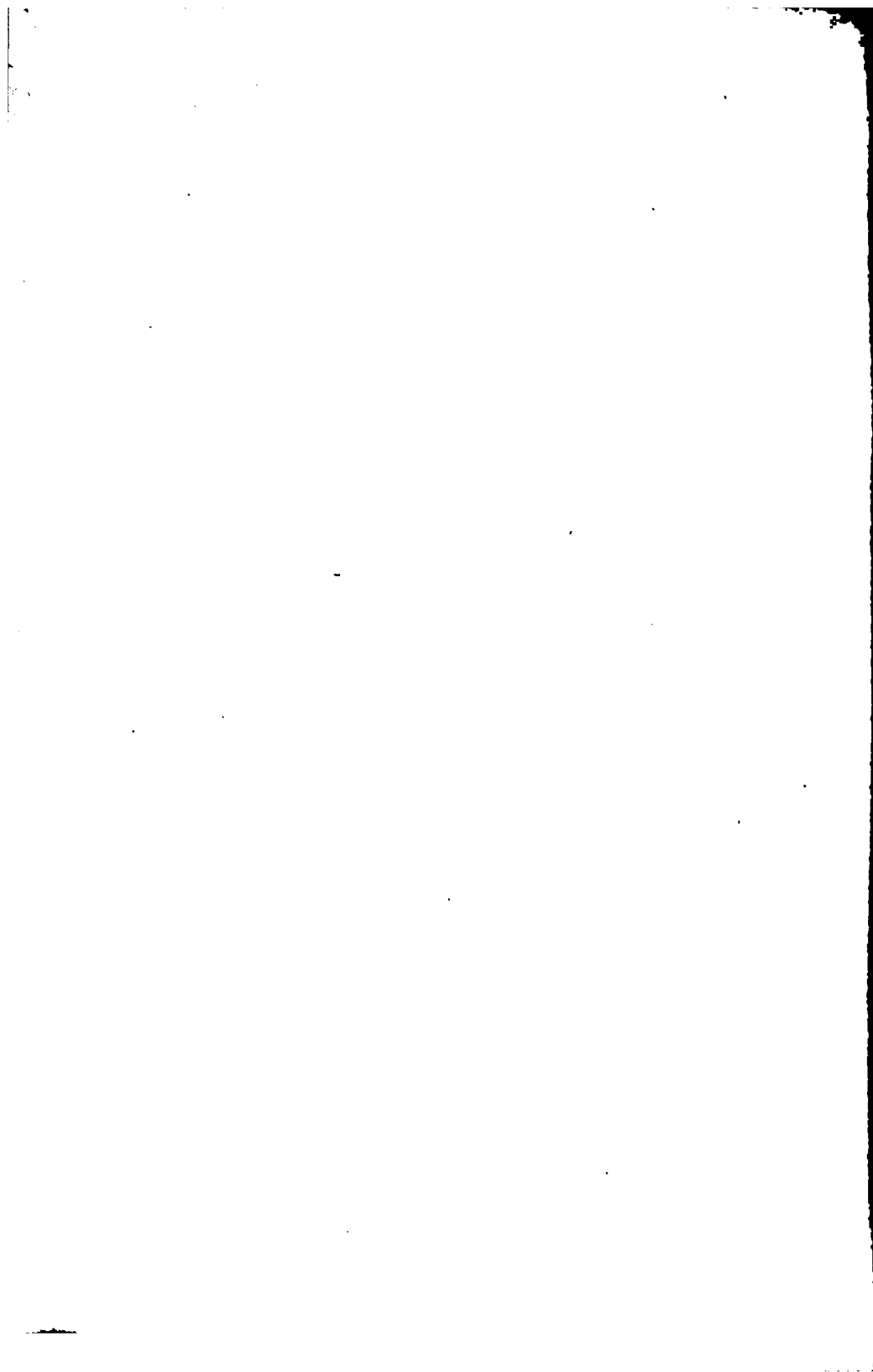
R. D. CLARK, M. D.,

Department Chemist.

L A W S

RELATIVE TO

DAIRY PRODUCTS.



LAWS RELATING TO DAIRY PRODUCTS.

Chapter 202.

An Act to prevent deception in sales of dairy products.

PASSED April 24, 1884; three-fifths being present.

The People of the State of New York, represented in Senate and Assembly, do enact as follows.

(Amended by section 1 of chapter 577 of the Laws of 1886, and chapter 223 of the Laws of 1887.)

Section 1. No person or persons shall sell or exchange, or expose for sale or exchange, any unclean, impure, unhealthy, adulterated, or unwholesome milk, or shall offer for sale any article of food made from the same or of cream from the same. This provision shall not apply to pure skim cheese made from milk which is clean, pure, healthy, wholesome and unadulterated, except by skimming. Whoever violates the provisions of this section is guilty of a misdemeanor and shall be punished by a fine of not less than twenty-five nor more than two hundred dollars, or by imprisonment of not less than one or more than six months, or both such fine and imprisonment for the first offense, and by six months' imprisonment for each subsequent offense.

(Section 2 of chapter 183 of the Laws of 1885, practically substituted.)

§ 2. No person shall keep cows for the production of milk for market, or for sale or exchange, or for manufacturing the same, or cream from the same, into articles of food, in a crowded or unhealthy condition, or feed the cows on food that is unhealthy, or that produces impure, unhealthy, diseased or unwholesome milk. No person shall manufacture from impure, unhealthy, diseased, or unwholesome milk, or of cream from the same, any article of food. Whoever violates the provisions of this section is guilty of a mis-

demeanor and shall be punished by a fine of not less than twenty-five nor more than two hundred dollars, or by imprisonment of not less than one or more than four months, or by both such fine and imprisonment for the first offense, and by four months imprisonment for each subsequent offense.

(Section 3 of chapter 183 of the Laws of 1885, practically substituted.)

§ 3. No person or persons shall sell, supply, or bring to be manufactured to any butter or cheese manufactory, any milk diluted with water, or any unclean, impure, unhealthy, adulterated, or unwholesome milk, or milk from which any cream has been taken (except pure skim milk to skim cheese factories), or shall keep back any part of the milk commonly known as "strippings," or shall bring or supply milk to any butter or cheese manufactory that is sour (except pure skim milk to skim cheese factories). No butter or cheese manufactories, except those who buy all the milk they use, shall use for their own benefit, or allow any of their employees or any other person to use, for their own benefit, any milk, or cream from the milk, or the product thereof brought to said manufactories, without the consent of the owners thereof. Every butter or cheese manufacturer, except those who buy all the milk they use, shall keep a correct account of all the milk daily received, and of the number of pounds and packages of butter, the number and aggregate weight of cheese made each day, the number of packages of cheese and butter disposed of, which shall be open to inspection to any person who delivers milk to such manufacturer. Whoever violates the provisions of this section shall be guilty of a misdemeanor and shall be punished for each offense by a fine of not less than twenty-five or more than two hundred dollars, or not less than one or more than six months' imprisonment, or both such fine and imprisonment.

(Section 4 of chapter 183 of the Laws of 1885, practically substituted.)

§ 4. No manufacturer of vessels for the package of butter shall sell or dispose of any such vessels without branding his name and

the true weight of the vessel or vessels on the same with legible letters or figures not less than one-fourth of an inch in length. Whoever violates the provisions of this section is guilty of a misdemeanor and shall be punished for each offense by a fine of not less than fifty nor more than one hundred dollars, or by imprisonment of not less than thirty or more than sixty days, or by both such fine and imprisonment.

(Section 5 of chapter 183 of the Laws of 1885, practically substituted.)

§ 5. No person shall sell or offer or expose for sale any milk except in the county from which the same is produced, unless each can, vessel or package containing such milk shall be distinctly and durably branded with letters not less than one inch in length, on the outside, above the center, on every can, vessel or package containing such milk, the name of the county from which the same is produced, and the same mark shall be branded or painted in a conspicuous place on the carriage or vehicle in which the milk is drawn to be sold, and such milk can only be sold in or retailed out of a can, vessel, package or carriage so marked. Whoever violates the provisions of this section shall be guilty of a misdemeanor, and shall be punished by a fine of not less than twenty-five nor more than two hundred dollars, or not less than two months' or more than four months' imprisonment, or both such fine and imprisonment for the first offense, and by four months' imprisonment for each subsequent offense.

Section 6 of chapter 183 of the Laws of 1885, practically substituted.)

§ 6. No person shall manufacture out of any oleaginous substance or substances, or any compound of the same, other than that produced from unadulterated milk, or cream from the same, any article designed to take the place of butter or cheese produced from pure, unadulterated milk or cream of the same, or shall sell, or offer for sale, the same as an article of food. This provision shall not apply to pure skim-milk cheese made from pure skim milk. Whoever violates the provisions of this section shall be guilty of a misde-

meanor, and be punished by a fine of not less than one hundred or more than five hundred dollars, or not less than six months' or more than one year's imprisonment, or by both such fine and imprisonment, for the first offense, and by imprisonment for one year for each subsequent offense.

(Section 10 of chapter 183 of the Laws of 1885, practically substituted.)

§ 7. No person shall offer, sell or expose for sale in full packages, butter or cheese branded or labeled with a false brand or label as to county or state in which the article is made. Whoever violates the provisions of this section is guilty of a misdemeanor, and shall be punished by a fine of not less than twenty-five or more than fifty dollars, or imprisonment of not less than fifteen or more than thirty days, for the first offense, and fifty dollars or thirty days' imprisonment for each subsequent offense.

(Section 11 of chapter 183 of the Laws of 1885, practically substituted.)

§ 8. No person shall manufacture, sell or offer for sale, any condensed milk unless the same shall be put up in packages, upon which shall be distinctly labeled or stamped the name or brand by whom or under which the same is made. No condensed milk shall be made or offered for sale unless the same is manufactured from pure, clean, healthy, fresh, unadulterated and wholesome milk, from which the cream has not been removed; or unless the proportion of milk solids contained in the condensed milk shall be in amount the equivalent of twelve per centum of milk solids in crude milk, and of such solids twenty-five per centum shall be fat. When condensed milk shall be sold from cans or packages not hermetically sealed, the vendor shall brand or label such cans or packages with the name of the county or counties from which the same was produced, and the name of the vendor. Whoever violates the provisions of this section shall be guilty of a misdemeanor, and be punished by a fine of not less than fifty or more than five hundred dollars, or by imprisonment of not more than six months, or both such fine and imprisonment for the first

offense, and by six months' imprisonment for each subsequent offense.

(Section 12 of chapter 183 of the Laws of 1885, practically substituted.)

§ 9. The governor, by and with the advice and consent of the senate, shall appoint a commissioner, who shall be known as the New York state dairy commissioner, who shall be a citizen of this state, and who shall hold his office for the term of two years, or until his successor is appointed, and shall receive a salary of three thousand dollars per annum and his necessary expenses incurred in the discharge of his official duties under this act; said commissioner shall be appointed within ten days after the passage of this act, and shall be charged, under the direction of the governor, with the enforcement of the various provisions thereof. Said commissioner may be removed from office at the pleasure of the governor, and his successor appointed as above provided for.

The said commissioner is hereby authorized and empowered to appoint such assistant commissioners and to employ such experts, chemists, agents and such counsel as may be deemed by him necessary for the proper enforcement of this law. The compensation to be fixed by the commissioner.

The said commissioner is also authorized to employ a clerk at an annual salary of not to exceed twelve hundred dollars.

The sum of thirty thousand dollars is hereby appropriated to be paid for such purpose out of any moneys in the treasury not otherwise appropriated. All charges, accounts and expenses authorized by this act shall be paid by the treasurer of the state, upon the warrant of the comptroller. The entire expenses of said commissioner shall not exceed the sum appropriated for the purposes of this act.

The said commissioner shall make annual reports to the legislature, not later than the fifteenth day of January of each year, of his work and proceedings, and shall report in detail the number of assistant commissioners, experts, chemists, agents and counsel he has employed, with their expenses and disbursements. The said commissioner shall have a room in the new capitol, to be set apart for his use by the capitol commissioner.

(Section 12 of chapter 183 of the Laws of 1885, practically substituted.)

§ 10. The said commissioner and assistant commissioners, and such experts, chemists, agents and counsel as they shall duly authorize for the purpose, shall have full access, egress and ingress to all places of business, factories, farms, buildings, carriages, cars, vessels and cans used in the manufacture and sale of any dairy products or any imitation thereof. They shall also have power and authority to open any package, can or vessel containing such articles which may be manufactured, sold or exposed for sale in violation of the provisions of this act, and may inspect the contents therein and may take therefrom samples for analyses.

(Section 14 of chapter 183 of the Laws of 1885, practically substituted.)

§ 11. Courts of special sessions shall have jurisdiction of all cases arising under this act, and their jurisdiction is hereby extended so as to enable them to enforce the penalties imposed by any or all of the sections hereof.

(Section 15 of chapter 183 of the Laws of 1885, practically substituted.)

§ 12. In all prosecutions under this act the costs thereof shall be paid out of the fine, if one is collected; if not, the same shall be paid in the manner now provided for by law, and the rest of the fine shall be paid to the state treasurer.

(Section 16 of chapter 183 of the Laws of 1885, practically substituted.)

§ 13. In all prosecutions under this act, relating to the sale and manufacture of unclean, impure, unhealthy, adulterated or unwholesome milk, if the milk be shown to contain more than eighty-eight per centum of water or fluids or less than twelve per centum of milk solids, which shall contain not less than three per centum of fat, it shall be declared adulterated, and milk drawn from cows within fifteen days before and five days after parturition, or from animals fed on distillery waste, or any substance in

the state of putrefaction, or fermentation, or upon any unhealthy food whatever, shall be declared unclean, impure, unhealthy and unwholesome milk. This section shall not prevent the feeding of ensilage from silos.

(Section 17 of chapter 183 of the Laws of 1885, practically substituted.)

§ 14. The doing of anything prohibited being done, and the not doing of anything directed to be done in this act shall be presumptive evidence of a willful intent to violate the different sections and provisions hereof.

§ 15. Chapters four hundred and sixty-seven of the laws of eighteen hundred and sixty-two, five hundred and forty-four and five hundred and eighteen of the laws of eighteen hundred and sixty-four, five hundred and fifty-nine of the laws of eighteen hundred and sixty-five, four hundred and fifteen of the laws of eighteen hundred and seventy-seven, two hundred and twenty and two hundred and thirty-seven of the laws of eighteen hundred and seventy-eight, four hundred and thirty-nine of the laws of eighteen hundred and eighty, and two hundred and fourteen of the laws of eighteen hundred and eighty-two, are hereby repealed.

§ 16. This act shall take effect on the first day of June, eighteen hundred and eighty-four, except as otherwise provided therein.

Chapter 183.

An Act to prevent deception in the sale of dairy products, and to preserve the public health, being supplementary to and in aid of chapter two hundred and two of the laws of eighteen hundred and eighty-four, entitled "An act to prevent deception in sales of dairy products."

PASSED April 30, 1885; three-fifths being present.

The People of the State of New York, represented in Senate and Assembly, do enact as follows.

(Amended by chapter 223 of Laws of 1887.)

Section 1. No person or persons shall sell or exchange, or expose for sale or exchange, any unclean, impure, unhealthy,

adulterated or unwholesome milk, or shall offer for sale any article of food made from the same, or of cream from the same. The provisions of this section shall not apply to skim milk sold to bakers or to housewives for their own use or manufacture, upon written orders for the same, nor to skim milk sold for use in the county in which it is produced. This provision shall not apply to pure skim cheese made from milk which is clean, pure, healthy, wholesome and unadulterated, except by skimming. Whoever violates the provisions of this section is guilty of a misdemeanor, and shall be punished by a fine of not less than twenty-five dollars nor more than two hundred dollars, or by imprisonment of not less than one month or more than six months, or both such fine and imprisonment for the first offense, and by six months' imprisonment for each subsequent offense.

§ 2. No person shall keep cows for the production of milk for market, or for sale or exchange, or for manufacturing the same, or cream from the same, into articles of food, in a crowded or unhealthy condition, or feed cows on food that is unhealthy, or that produces impure, unhealthy, diseased or unwholesome milk. No person shall manufacture from impure, unhealthy, diseased or unwholesome milk, or of cream from the same, any article of food. Whoever violates the provisions of this section is guilty of a misdemeanor and shall be punished by a fine of not less than twenty-five dollars nor more than two hundred dollars, or by imprisonment of not less than one month or more than four months, or by both such fine and imprisonment for the first offense, and by four months' imprisonment for each subsequent offense.

§ 3. No person or persons shall sell, supply or bring to be manufactured to any butter or cheese manufactory, any milk diluted with water or any unclean, impure, unhealthy, adulterated or unwholesome milk, or milk from which any cream has been taken (except pure skim milk to skim cheese factories), or shall keep back any part of the milk commonly known as "strippings," or shall bring or supply milk to any butter or cheese manufactory that is sour (except pure skim milk to skim cheese factories). No butter or cheese manufactories, except those who buy all the milk

they use, shall use for their own benefit, or allow any of their employees or any other person to use for their own benefit, any milk, or cream from the milk, or the product thereof, brought to said manufactories without the consent of the owners thereof. Every butter or cheese manufacturer, except those who buy all the milk they use shall keep a correct account of all the milk daily received, and of the number of packages of butter and cheese made each day, and the number of packages and aggregate weight of cheese and butter disposed of each day, which account shall be open to inspection to any person who delivers milk to such manufacturer. Whoever violates the provisions of this section shall be guilty of a misdemeanor, and shall be punished for each offense by a fine of not less than twenty-five dollars or more than two hundred dollars, or not less than one month or more than six months' imprisonment, or by both such fine and imprisonment.

§ 4. No manufacturer of vessels for the package of butter shall sell or dispose of any such vessels without branding his name and the true weight of the vessel or vessels on the same, with legible letters or figures not less than one-fourth of an inch in length. Whoever violates the provisions of this section is guilty of a misdemeanor, and shall be punished for each offense by a fine of not less than fifty dollars nor more than one hundred dollars, or by imprisonment of not less than thirty days or more than sixty days, or by both such fine and imprisonment.

§ 5. No person shall sell, or offer or expose for sale, any milk except in the county from which the same is produced, unless each can, vessel or package containing such milk shall be distinctly and durably branded with letters not less than one inch in length, on the outside above the center, on every can, vessel or package containing such milk, the name of the county from which the same is produced; and the same marks shall be branded or painted in a conspicuous place on the carriage or vehicle in which the milk is drawn to be sold; and such milk can only be sold in, or retailed out of a can, vessel, package or carriage so marked. Whoever violates the provisions of this section shall be guilty of a misdemeanor, and shall be punished by a fine of not less than twenty-

five dollars nor more than two hundred dollars, or not less than two months' or more than four months' imprisonment, or both such fine and imprisonment, for the first offense, and by four months' imprisonment for each subsequent offense.

INVALID—(PEOPLE v. MARX.)

§ 6. No person shall manufacture out of any oleaginous substance or substances, or any compound of the same, other than that produced from unadulterated milk, or of cream from the same, any article designed to take the place of butter or cheese produced from pure unadulterated milk or cream of the same, or shall sell, or offer for sale, the same as an article of food. This provision shall not apply to pure skim-milk cheese, made from pure skim-milk. Whoever violates the provisions of this section shall be guilty of a misdemeanor, and be punished by a fine of not less than two hundred dollars nor more than five hundred dollars, or not less than six months' or more than one year's imprisonment, or both such fine and imprisonment for the first offense, and by imprisonment for one year for each subsequent offense.

(Amended by section 2 of chapter 577 of Laws of 1886.)

§ 7. No person by himself or his agents or servants shall render or manufacture out of any animal fat or animal or vegetable oils not produced from unadulterated milk or cream from the same, any article or product in imitation or semblance of or designed to take the place of natural butter or cheese produced from pure unadulterated milk or cream of the same, nor shall he or they mix, compound with, or add to milk, cream or butter any acids or other deleterious substance or any animal fats or animal or vegetable oils not produced from milk or cream, with design or intent to render, make or produce any article or substance or any human food in imitation or semblance of natural butter or cheese, nor shall he sell, keep for sale, or offer for sale any article, substance or compound made, manufactured or produced in violation of the provisions of this section, whether such article, substance or compound shall be made or produced in this state or in any other state or country. Whoever violates the provisions of this section shall be guilty of a misdemeanor and be punished by a fine of

not less than two hundred dollars nor more than five hundred dollars, or not less than six months' or more than one years' imprisonment for the first offense, and by imprisonment for one year for each subsequent offense. Nothing in this section shall impair the provisions of section six of this act.

(Amended by section 3 of chapter 577 of Laws of 1886.)

§ 8. No person shall manufacture, mix or compound with or add to natural milk, cream or butter any animal fats or animal or vegetable oils, nor shall he make or manufacture any oleaginous substance not produced from milk or cream, with intent to sell the same for butter or cheese made from unadulterated milk or cream, or have the same in his possession, or offer the same for sale with such intent, nor shall any article or substance or compound so made or produced, be sold for butter or cheese, the product of the dairy. If any person shall coat, powder or color with annatto or any coloring matter whatever butterine or oleomargarine, or any compounds of the same or any product or manufacture made in whole or in part from animal fats or animal or vegetable oils not produced from unadulterated milk or cream whereby the said product, manufacture or compound shall be made to resemble butter or cheese, the product of the dairy, or shall have the same in his possession, or shall sell or offer for sale or have in his possession any of the said products which shall be colored or coated in semblance of or to resemble butter or cheese, it shall be conclusive evidence of an intent to sell the same for butter or cheese, the product of the dairy. Whoever violates any of the provisions of this section shall be guilty of a misdemeanor, and be punished by a fine of not less than two hundred dollars nor more than one thousand dollars. This section shall not be construed to impair or affect the prohibitions of sections six and seven of this act.

§ 9. Every manufacturer of full-milk cheese may put a brand upon each cheese indicating "full-milk cheese," and the date of the month and year when made; and any person using this brand upon any cheese made from which any cream whatever has been taken shall be guilty of a misdemeanor, and shall be punished for

each offense by a fine of not less than one hundred dollars nor more than five hundred dollars.

§ 10. No person shall offer, sell or expose for sale in full packages, butter or cheese branded or labeled with a false brand or label as to county or state in which the article is made. Whoever violates the provisions of this section is guilty of a misdemeanor, and shall be punished by a fine of not less than twenty-five dollars or more than fifty dollars, or imprisonment of not less than fifteen days or more than thirty days for the first offense, and fifty dollars or thirty days' imprisonment for each subsequent offense.

§ 11. No person shall manufacture, sell or offer for sale any condensed milk, unless the same shall be put up in packages upon which shall be distinctly labeled or stamped the name, or brand, by whom or under which the same is made. No condensed milk shall be made, or offered for sale, unless the same is manufactured from pure, clean, healthy, fresh, unadulterated and wholesome milk, from which the cream has not been removed, or unless the proportion of milk solids contained in the condensed milk shall be in amount the equivalent of twelve per centum of milk solids in crude milk, and of such solids twenty-five per centum shall be fat. When condensed milk shall be sold from cans, or packages not hermetically sealed, the vendor shall brand or label such cans or packages with the name of the county or counties from which the same was produced, and the name of the vendor. Whoever violates the provisions of this section shall be guilty of a misdemeanor, and be punished by a fine of not less than fifty dollars or more than five hundred dollars, or by imprisonment of not more than six months, or by both such fine and imprisonment for the first offense, and by six months' imprisonment for each subsequent offense.

§ 12. Upon the expiration of the term of office of the present commissioner, the governor, by and with the advice and consent of the senate, shall appoint a commissioner, who shall be known as the New York state dairy commissioner, who shall be a citizen of this state, and who shall hold his office for the term of two years, or until his successor is appointed, and shall receive a salary of

three thousand dollars per annum, and his necessary expenses incurred in the discharge of his official duties under this act. Said commissioner shall be charged, under the direction of the governor, with the enforcement of the various provisions thereof, and with all laws prohibiting or regulating the adulteration of butter, cheese or milk. The said commissioner is hereby authorized and empowered to appoint such assistant commissioners and to employ such experts, chemists, agents and such counsel as may be deemed by him necessary for the proper enforcement of this law, their compensation to be fixed by the commissioner. The said commissioner is also authorized to employ a clerk at an annual salary not to exceed twelve hundred dollars. The sum of fifty thousand dollars is hereby appropriated, to be paid for such purpose out of any moneys in the treasury not otherwise appropriated. All charges, accounts and expenses authorized by this act shall be paid by the treasurer of the state upon the warrant of the comptroller, after such expenses have been audited and allowed by the comptroller. The entire expenses of said commissioner shall not exceed the sum appropriated for the purposes of this act. The said commissioner shall make annual reports to the legislature, on or before the fifteenth day of January of each year, of his work and proceedings, and shall report in detail the number of assistant commissioners, experts, chemists, agents and counsel he has employed, with their expenses and disbursements. The said commissioner shall have a room in the new capitol, to be set apart for his use by the capitol commissioner. The said commissioner and assistant commissioners and such experts, chemists, agents and counsel as they shall duly authorize for the purpose, shall have full access, egress and ingress to all places of business, factories, farms, buildings, carriages, vessels and cans used in the manufacture and sale of any dairy products or any imitation thereof. They shall also have power and authority to open any package, can or vessel containing such articles which may be manufactured, sold or exposed for sale, in violation of the provisions of this act, and may inspect the contents therein and may take therefrom samples for analysis. This section shall not affect the tenure of the office of the present commissioner.

§ 13. Upon the application for a warrant under this act, the certificate of the analyst or chemist of any analysis made by him shall be sufficient evidence of the facts therein stated. Every such certificate shall be duly signed and acknowledged by such analyst or chemist before an officer authorized to take acknowledgment of conveyances of real estate.

§ 14. Courts of special sessions shall have jurisdiction of all cases arising under this act, and their jurisdiction is hereby extended so as to enable them to enforce the penalties imposed by any or all sections thereof.

(Amended by section 4 of chapter 577 of Laws of 1886.)

§ 15. In all prosecutions under this act, one-half of the money shall be paid by the court or clerk thereof to the city or county where the recovery shall be had, for the support of the poor, except in the city and county of New York, shall be equally divided between the pension funds of the police and fire departments, and the residue shall be paid to the dairy commissioner, who shall account therefor to the treasury of the state, and be added to any appropriation made to carry out the provisions of this act. All sums of money expended by the dairy commissioner under the provisions of this act, shall be audited and allowed by the comptroller of the state. Any bond given by any officer shall be subject to the provisions of this section.

(Amended by chapter 430 of Laws of 1887.)

§ 16. In all prosecutions under this act relating to the sale and manufacture of unclean, impure, unhealthy, adulterated or unwholesome milk, if the milk be shown to contain more than eighty-eight per centum of water or fluids, or less than twelve per centum of milk solids, which shall contain not less than three per centum of fat, it shall be declared adulterated, and milk drawn from cows within fifteen days before, and five days after, parturition, or from animals fed on distillery waste, or any substance in the state of putrefaction or fermentation, or upon any unhealthy food whatever, shall be declared unclean, unhealthy,

impure and unwholesome milk. This section shall not prevent the feeding of ensilage from silos.

(Amended by section 4 of chapter 458 of Laws of 1885.)

§ 17. The doing of anything prohibited being done, and the not doing of anything directed to be done in this act, shall be presumptive evidence of a willful intent to violate the different sections and provisions thereof. If any person shall suffer any violation of the provisions of this act by his agent, servant, or in any room or building occupied or controlled by him, he shall be deemed a principal in such violation and punished accordingly.

§ 18. Chapter four hundred and sixty-seven of the laws of eighteen hundred and sixty-two, five hundred and forty-four and five hundred and eighteen of the laws of eighteen hundred and sixty-four, five hundred and fifty-nine of the laws of eighteen hundred and sixty-five, four hundred and fifteen of the laws of eighteen hundred and seventy-seven, two hundred and twenty and two hundred and thirty-seven of the laws of eighteen hundred and seventy-eight, four hundred and thirty-nine of the laws of eighteen hundred and eighty, and two hundred and fourteen of the laws of eighteen hundred and eighty-two, are hereby repealed.

(Amended by section 5 of chapter 577 of Laws of 1886, and by section 2 of chapter 583 of Laws of 1887.)

§ 19. If any person shall, by himself or another, violate any of the provisions of sections one, two, three, four or five of this act, or knowingly suffers a violation thereof by his agent, or in any building or room occupied by him, he shall in addition to the fines and punishments therein prescribed for each offense, forfeit and pay a fixed penalty of one hundred dollars. If any person, by himself or another, shall violate any of the provisions of section six, seven or eight of this act, he shall, in addition to the fines and penalties herein prescribed for each offense, forfeit and pay a fixed penalty of five hundred dollars. Such penalties shall be recovered with costs in any court of this state having jurisdiction thereof, in an action to be prosecuted by the dairy

commissioner or any of his assistants in the name of the people of the state of New York.

§ 20. This act and each section thereof is declared to be enacted to prevent deception in the sale of dairy products, and to preserve the public health which is endangered by the manufacture, sale or use of the articles or substances herein regulated or prohibited.

§ 21. This act shall take effect immediately. Sections six and seven shall not apply to any product manufactured, or in process of manufacture at the time of the passage of this act; but neither this exemption nor this act shall impair the power to prosecute any violations heretofore committed of section six of the act of which this act is supplemental.

Chapter 193.

An Act to amend chapter two hundred and two of the laws of eighteen hundred and eighty-four, entitled "An act to prevent deception in sales of dairy products."

PASSED April 30, 1885; three-fifths being present.

The People of the State of New York, represented in Senate and Assembly, do enact as follows:

Section 1. Section seven of chapter two hundred and two of the laws of eighteen hundred and eighty-four, entitled "An act to prevent deception in sales of dairy products," is hereby amended to read as follows:

§ 7. No person shall offer, sell or expose for sale butter or cheese branded or labeled with a false brand or label as to the quality of the article or the county or state in which the article is made. The New York state dairy commissioner is hereby authorized and directed to procure and issue to the cheese manufactories of the state, upon proper application therefor and under such regulations as to the custody and use thereof as he may prescribe, a uniform stencil brand bearing a suitable device or motto, and the words "New York state full cream cheese." Every brand issued shall be used upon the outside of the cheese and also upon the package containing the same, and shall bear a different number for each

separate manufactory, and the commissioner shall keep a book in which shall be registered the name, location and number of each manufactory using the said brand, and the name or names of the persons at each manufactory authorized to use the same. It shall be unlawful to use or permit such stencil brand to be used upon any other than full cream cheese or packages containing the same. Whoever violates the provisions of this section is guilty of a misdemeanor, and for each and every cheese or package so falsely branded shall be punished by a fine of not less than twenty-five dollars or more than fifty dollars, or imprisonment of not less than fifteen or more than thirty days.

§ 2. This act shall take effect immediately.

Chapter 427.

An Act to protect butter and cheese manufacturers.

PASSED June 8, 1885; three-fifths being present.

The People of the State of New York, represented in Senate and Assembly, do enact as follows :

Section 1. Whoever shall with intent to defraud, sell, supply or bring to be manufactured to any butter or cheese manufactory in this state, any milk diluted with water, or in any way adulterated, unclean or impure, or milk from which any cream has been taken, or milk commonly known as skimmed milk, or whoever shall keep back any part of the milk as strippings, or whoever shall knowingly bring or supply milk to any butter or cheese manufactory, that is tainted or sour, or whoever shall knowingly bring or supply to any butter or cheese manufactory, milk drawn from cows within fifteen days before parturition, or within three days after parturition, or any butter or cheese manufacturers who shall knowingly use or allow any of his or her employees or any other person to use for his or her benefit, or for their own individual benefit, any milk or cream from the milk brought to said butter or cheese manufacturer, without the consent of all the owners thereof, or any butter or cheese manufacturer who shall refuse or neglect to keep or cause to be kept a correct account, open to the inspection of any one furnish-

ing milk to such manufacturer, of the amount of milk daily received, or of the number of pounds of butter and the number of cheese made each day, or of the number cut or otherwise disposed of, and the weight of each, shall for each and every offense forfeit and pay a sum not less than twenty-five dollars nor more than one hundred dollars, with costs of suit to be sued for in any court of competent jurisdiction for the benefit of the person or persons, firm or association, or corporation or their assigns upon whom such fraud or neglect shall be committed. But nothing in this act shall affect, impair or repeal any of the provisions of chapter two hundred and two of the laws of eighteen hundred and eighty-four, or of the acts amendatory thereof or supplementary thereto.

§ 2. This act shall take effect immediately.

Chapter 458.

An Act to amend chapter one hundred and eighty-three of the laws of eighteen hundred and eighty-five, entitled "An act to prevent deception in the sale of dairy products, and to preserve the public health, being supplementary to and in aid of chapter two hundred and two of the laws of eighteen hundred and eighty-four, entitled 'An act to prevent deception in the sales of dairy products.'"

PASSED June 9, 1885; three-fifths being present.

The People of the State of New York, represented in Senate and Assembly, do enact as follows:

Section 1. Section six of chapter one hundred and eighty-three of the laws of eighteen hundred and eighty-five, entitled "An act to prevent deception in the sale of dairy products, and to preserve the public health, being supplementary to and in aid of chapter two hundred and two of the laws of eighteen hundred and eighty-four, entitled 'An act to prevent deception in sales of dairy products,'" is amended to read as follows:

INVALID — (PEOPLE V. MARX.)

§ 6. No person shall manufacture out of any oleaginous substance or substances, or any compound of the same, other than

that produced from unadulterated milk, or of cream from the same, any article designed to take the place of butter or cheese produced from pure unadulterated milk or cream of the same, or shall sell, or offer for sale, the same as an article of food. This provision shall not apply to pure skim-milk cheese, made from pure skim-milk. Whoever violates the provisions of this section shall be guilty of a misdemeanor, and be punished by a fine of not less than one hundred dollars nor more than five hundred dollars, or not less than six months' or more than one year's imprisonment, or both such fine and imprisonment for the first offense, and by imprisonment for one year for each subsequent offense.

§ 2. Section seven of said act is amended so as to read as follows:

(Amended by section 2, chapter 577 of Laws of 1886.)

§ 7. No person by himself or his agents or servants shall render or manufacture out of any animal fat or animal or vegetable oils not produced from unadulterated milk or cream from the same, any article or product in imitation or semblance of or designed to take the place of natural butter or cheese produced from pure unadulterated milk or cream of the same; nor shall he or they mix, compound with, or add to milk, cream or butter any acids or other deleterious substance or any animal fats or animal or vegetable oils not produced from milk or cream, with design or intent to render, make or produce any article or substance or any human food in imitation or semblance of natural butter or cheese, nor shall he sell, keep for sale, or offer for sale any article, or substance or compound made, manufactured or produced in violation of the provisions of this section, whether such article, substance or compound shall be made or produced in this state or any other state or country. Whoever violates the provisions of this section shall be guilty of a misdemeanor and be punished by a fine of not less than one hundred dollars nor more than five hundred dollars, or not less than six months' or more than one year's imprisonment for the first offense, and by imprisonment for one year for each subsequent offense. Nothing in this section shall impair the provisions of section six of this act.

§ 3. Section eight of said act is amended so as to read as follows:

(Amended by section 3 of chapter 577 of Laws of 1886.)

§ 8. No person shall manufacture, mix or compound with or add to natural milk, cream or butter any animal fats or animal or vegetable oils, nor shall he make or manufacture any oleaginous substance not produced from milk or cream, with intent to sell the same for butter or cheese made from unadulterated milk or cream, or have the same in his possession, or offer the same for sale with such intent, nor shall any article or substance or compound so made or produced, be sold for butter or cheese, the product of the dairy. If any person shall coat, powder or color with annatto or any coloring matter whatever butterine or oleomargarine, or any compounds of the same or any product or manufacture made in whole or in part from animal fats or animal or vegetable oils not produced from unadulterated milk or cream whereby the said product, manufacture or compound shall be made to resemble butter or cheese, the product of the dairy, or shall have the same in his possession, or shall sell or offer for sale or have in his possession any of the said products which shall be colored or coated in semblance of or to resemble butter or cheese, it shall be conclusive evidence of an intent to sell the same for butter or cheese, the product of the dairy. Whoever violates any of the provisions of this section shall be guilty of a misdemeanor, and be punished by a fine of not less than one hundred dollars nor more than one thousand dollars. This section shall not be construed to impair or affect the prohibitions of sections six and seven of this act.

§ 4. Section seventeen of said act is amended so as to read as follows:

§ 17. The doing of anything herein prohibited being done, shall be evidence of a violation of the provisions of this act relative to the thing so prohibited; and the not doing of anything herein directed to be done, shall be evidence of a violation of the provisions of this act relative to the thing so directed to be done. If any person shall suffer any violation of the provisions of this act

by his agent, servant, or in any room or building occupied or controlled by him, he shall be deemed a principal in such violation and punished accordingly.

§ 5. This act shall take effect immediately.

Chapter 577.

An Act to amend chapter one hundred and eighty-three of the laws of eighteen hundred and eighty-five, entitled "An act to prevent deception in the sale of dairy products, and to preserve the public health," being supplementary to and in aid of chapter two hundred and two of the laws of eighteen hundred and eighty-four, entitled "An act to prevent deception in sales of dairy products."

PASSED June 4, 1886; three-fifths being present.

The People of the State of New York, represented in Senate and Assembly, do enact as follows :

Section 1. Section one of chapter one hundred and eighty-three of the laws of eighteen hundred and eighty-five, entitled "An act to prevent deception in the sale of dairy products, and to preserve the public health," being supplementary to and in aid of chapter two hundred and two of the laws of eighteen hundred and eighty-four, entitled "An act to prevent deception in sales of dairy products," is hereby amended so as to read as follows:

(Amended by chapter 223 of Laws of 1887.)

§ 1. No person or persons shall sell or exchange, or expose for sale or exchange, any unclean, impure, unhealthy, adulterated or unwholesome milk, or shall offer for sale any article of food made from the same, or of cream from the same. The provisions of this section shall not apply to skimmed milk sold for use in the county in which it is produced, provided it is sold for and as such. This provision shall not apply to pure skim-cheese made from milk which is clean, pure, healthy, wholesome and unadulterated, except by skimming. Whoever violates the provisions of this section is guilty of a misdemeanor, and shall be punished by

a fine of not less than twenty-five dollars nor more than two hundred dollars, or by imprisonment of not less than one month or more than six months, or by both such fine and imprisonment, for the first offense, and by six months' imprisonment for each subsequent offense.

§ 2. Section seven of chapter one hundred and eighty-three of the laws of eighteen hundred and eighty-five, as amended by chapter four hundred and fifty-eight, of the laws of eighteen hundred and eighty-five, is hereby amended so as to read as follows:

§ 7. No person by himself or his agents or servants shall render or manufacture out of any animal fat or animal or vegetable oils not produced from unadulterated milk or cream from the same, any article in imitation or semblance of natural butter or cheese produced from pure unadulterated milk or cream of the same, nor mix, compound with, or add to milk, cream or butter any acids or other deleterious substance or any animal fats or animal or vegetable oils not produced from milk or cream, so as to produce any article or substance or any human food in imitation or semblance of natural butter or cheese, nor sell, keep for sale, or offer for sale, any article, substance or compound made, manufactured or produced in violation of the provisions of this section, whether such article, substance or compound shall be made or produced in this State or elsewhere. This section shall not be so construed as to require evidence of a willful or intentional violation thereof. Whoever violates the provisions of this section shall be guilty of a misdemeanor, and be punished by a fine of not less than one hundred dollars, nor more than five hundred dollars or not less than six months or more than one year's imprisonment for the first offense, and by imprisonment for one year for each subsequent offense. Nothing in this section shall impair the provisions of section six of this act.

§ 3. Section eight of chapter one hundred and eighty-three of the laws of eighteen hundred and eighty-five, as amended by chapter four hundred and fifty-eight of the laws of eighteen hundred and eighty-five, is hereby further amended so as to read as follows:

§ 8. No person shall manufacture, mix or compound with or add to natural milk, cream or butter any animal fats or animal or vegetable oils, nor shall he make or manufacture any oleaginous substance not produced from milk or cream, with intent to sell the same for butter or cheese made from unadulterated milk or cream, or have the same in his possession, or offer the same for sale with such intent, nor shall any article or substance or compound so made or produced, be sold intentionally or otherwise as and for butter or cheese, the product of the dairy. No person shall coat, powder or color with annatto or any coloring matter whatever, butterine or oleomargarine, or any compounds of the same or any product or manufacture made in whole or in part from animal fats or animal or vegetable oils not produced from unadulterated milk or cream whereby the said product, manufacture or compound shall resemble butter or cheese, the product of the dairy, or shall have the same in his possession, with intent to sell the same, or shall sell or offer the same for sale. No person shall be excused from liability under this section or section seven of this act on account of want of knowledge of the nature or ingredients of the product so in his possession, sold or offered for sale by him. Whoever violates any of the provisions of this section shall be guilty of a misdemeanor, and be punished by a fine of not less than one hundred dollars nor more than one thousand dollars. This section shall not be construed to impair or affect the prohibitions of sections six and seven of this act.

§ 4. Section fifteen of such act, chapter one hundred and eighty-three of the laws of eighteen hundred and eighty-five, is hereby amended so as to read as follows:

§ 15. In all prosecutions under this act, one-half of the money shall be paid by the court or clerk thereof to the city or county where the recovery shall be had, for the support of the poor, except in the city and county of New York, and the city of Brooklyn shall be equally divided between the pension funds of the police and fire departments, and the residue shall be paid to the treasury of the state. All sums of money expended by the dairy commissioner under the provisions of this act, shall be audited

and allowed by the comptroller of the State. Any bond given by any officer shall be subject to the provisions of this section.

§ 5. Section nineteen of such act, chapter one hundred and eighty-three of the laws of eighteen hundred and eighty-five, is hereby amended so as to read as follows:

(Amended by section 2 of chapter 583 of Laws of 1887.)

§ 19. If any person shall, by himself or another, violate any of the provisions of sections one, two, three, four or five of this act, or knowingly suffer a violation thereof by his agent, or in any building or room occupied by him, he shall in addition to the fines and punishments therein prescribed, for each offense forfeit and pay a fixed penalty of one hundred dollars. If any person, by himself or another, shall violate any of the provisions of sections six, seven or eight of this act, he shall, in addition to the fines and penalties herein prescribed, for each offense forfeit and pay a fixed penalty of five hundred dollars. Such penalties shall be recovered with costs in any court of this state having jurisdiction thereof, in an action to be prosecuted by the dairy commissioner or any of his assistants or by any citizen authorized to sue in the name of the people of the State of New York.

§ 6. The following sections are added to said act, chapter one hundred and eighty-three of the laws of eighteen hundred and eighty-five:

(Amended by section 3 of chapter 583 of Laws of 1887.)

§ 22. For the purposes of said act, chapter one hundred and eighty-three of the laws of eighteen hundred and eighty-five, as amended by chapter four hundred and fifty-eight of the laws of eighteen hundred and eighty-five, and as hereby amended, the terms "natural butter and cheese," "natural butter and cheese produced from pure unadulterated milk or cream of the same," "butter or cheese made from unadulterated milk or cream," "butter or cheese the product of the dairy," and "butter or cheese" shall be understood to mean the products usually known by the terms "butter" and "cheese" and which are manufac-

tured exclusively from milk or cream, or both, with salt and rennet, and with or without coloring matter or sage.

§ 23. The prosecution shall not be compelled to elect in any trial for the misdemeanors wheresoever committed, or suit for the penalties wheresoever incurred by the violations of sections six, seven or eight where the indictment, information or complaint charges a violation of any two or all such sections of said act, as amended, between the charges or counts under such different sections whether such prosecutions or suits have already been commenced or shall hereafter be instituted.

§ 24. An action now or hereafter brought to recover a penalty provided by section nineteen of said act, chapter one hundred and eighty-three of the laws of eighteen hundred and eighty-five, shall have a preference upon the calendar of the courts of record of this State next after civil causes entitled to a preference under the provisions of subdivision one of section seven hundred and ninety-one of the code of civil procedure, where the attorney for the people therein has given notice, at the time of the service of notice of trial or argument, of a particular day in a term on which he will move it. If the action is not moved by him for trial or argument on that day, or as soon thereafter in the same term as the court can hear it the other party may then move the trial or argument, otherwise it shall not be moved out of its order at that term except by the special order of the court. The note of issue filed by such attorney for the people shall state the day in the term on which he has given notice that he will move it, and the clerk of the court shall place such cause upon the day calendar of that day as a preferred cause as hereinbefore provided. No order for the clerk to do so shall be necessary.

§ 25. Actions for penalties under the provisions of this act and of the act of which this is amendatory may be brought and prosecuted in the name of the people of the state of New York by any citizen of the State, and the citizen so prosecuting said action shall be entitled to and shall receive one-half of the penalty or judgment recovered. The balance of the judgment or recovery shall be paid over to the city or county in which the action is brought as provided by section fifteen of chapter one hundred and eighty-three

of the laws of eighteen hundred and eighty-five. Any citizen so prosecuting shall execute and file an undertaking with the court in which the action is brought in the penalty of one hundred dollars conditioned for the payment of any costs which the defendant in the action may recover.

§ 7. This act shall take effect on the first day of August, eighteen hundred and eighty-six; but the sections as herein amended shall not apply to any product manufactured or in process of manufacture on the first day of August, eighteen hundred and eighty-six. This act shall not impair the power to prosecute any violations committed prior to the time of its taking effect, of the sections hereby amended pursuant to and in the manner and under the rules and regulations provided by such sections as they existed prior to the passage of this act. This act is declaratory of the existing law.

Chapter 223.

An Act to amend chapter five hundred and seventy-seven of the laws of eighteen hundred and eighty-six, entitled "An act to amend chapter one hundred and eighty-three of the laws of eighteen hundred and eighty-five, entitled 'An act to prevent deception in the sale of dairy products, and to preserve the public health,' being supplementary to and in aid of chapter two hundred and two of the laws of eighteen hundred and eighty-four, entitled 'An act to prevent deception in the sales of dairy products.'"

PASSED April 27, 1887; three-fifths being present; without the approval of the Governor.*

The People of the State of New York, represented in Senate and Assembly, do enact as follows:

Section 1. Section one of chapter five hundred and seventy-seven of the laws of eighteen hundred and eighty-six, entitled "An act to amend chapter one hundred and eighty-three of the laws of

*Not returned by the Governor within ten days after it was presented to him, and became a law without his signature. [Art. IV, sec. 9, Constitution of the State of New York.]

eighteen hundred and eighty-five, entitled 'An act to prevent deception in the sale of dairy products, and to preserve the public health,' being supplementary to and in aid of chapter two hundred and two of the laws of eighteen hundred and eighty-four, entitled 'An act to prevent deception in sales of dairy products,' is hereby amended so as to read as follows:

§ 1. No person or persons shall sell or exchange, or expose for sale or exchange,* any unclean, impure, unhealthy, adulterated or unwholesome milk, or shall offer for sale any article of food made from the same, or of cream from the same. The provisions of this section shall not apply to skimmed milk sold for use in the county in which it is produced, provided it is sold for and as such. This provision shall not apply to pure skim cheese made from milk which is clean, pure, healthy, wholesome and unadulterated, except by skimming. Whoever violates the provisions of this section is guilty of a misdemeanor, and shall be punished by a fine of not less than twenty-five dollars nor more than two hundred dollars or by imprisonment of not less than one month or more than six months, or by both such fine and imprisonment for the first offense; and by a fine of not less than fifty dollars nor more than four hundred dollars or by imprisonment of not less than one month nor more than six months, or by both such fine and imprisonment for a second offense, and for a third or any subsequent offense by a fine of not less than two hundred dollars and imprisonment not less than thirty days and not exceeding three months.

§ 2. This act shall take effect immediately.

*So in the original.

Chapter 430.

An Act to amend chapter one hundred and eighty-three of the laws of eighteen hundred and eighty-five, entitled "An act to prevent deception in the sale of dairy products and to preserve the public health, being supplementary to and in aid of chapter two hundred and two of the laws of eighteen hundred and eighty-four, entitled 'An act to prevent deception in the sale of dairy products.'"

PASSED May 23, 1887; three-fifths being present.

The People of the State of New York, represented in Senate and Assembly, do enact as follows:

Section 1. Section sixteen of chapter one hundred and eighty-three of the laws of eighteen hundred and eighty-five, entitled "An act to prevent deception in the sale of dairy products, and to preserve the public health, being supplementary to and in aid of chapter two hundred and two of the laws of eighteen hundred and eighty-four, entitled 'An act to prevent deception in sales of dairy products,' " is hereby amended so as to read as follows:

§ 16. When any officer, authorized by this act to inspect milk offered for sale shall, in the discharge of his duties, take a sample of milk for purposes of analysis, it shall be his duty to take duplicate samples thereof, in the presence of at least one witness, and he shall, in the presence of such witness, seal both of the said samples, and shall tender and if accepted deliver, at the time of such taking, one sample to the vender of said milk or to the person having custody of the same with a statement, in writing, of the cause of the sample having been taken. In all prosecutions, under this act, relating to the manufacture and sale of unclean, impure, unhealthy, adulterated or unwholesome milk, if the milk be shown to contain more than eighty-eight per centum of water or fluids, or less than twelve per centum of milk solids, which should contain not less than three per centum of fat, it shall be declared adulterated; and milk drawn from cows within fifteen days before, and five days after, parturition, or from animals fed on distillery waste, or any substance in the state of fermentation or putrefaction, or upon any unhealthy food whatever, shall be declared unclean.

unhealthy, impure and unwholesome milk. This section shall not prevent the feeding of ensilage.

§ 2. This act shall take effect immediately.

Chapter 583.

An Act to amend chapter one hundred and eighty-three of the laws of eighteen hundred and eighty-five, entitled "An act to prevent deception in the sale of dairy products, and to preserve the public health, being supplementary to and in aid of chapter two hundred and two of the laws of eighteen hundred and eighty-four, entitled 'An act to prevent deception in sales of dairy products,' as amended by chapter five hundred and seventy-seven of the laws of eighteen hundred and eighty-six, entitled 'An act to amend chapter one hundred and eighty-three of the laws of eighteen hundred and eighty-five, entitled 'An act to prevent deception in the sale of dairy products, and to preserve the public health,' being supplementary to and in aid of chapter two hundred and two of the laws of eighteen hundred and eighty-four, entitled 'An act to prevent deception in sales of dairy products.'"

• PASSED June 16, 1887; three-fifths being present.

The People of the State of New York, represented in Senate and Assembly, do enact as follows:

Section 1. The following sections are added to said act chapter one hundred and eighty-three of the laws of eighteen hundred and eighty-five, entitled "An act to prevent deception in the sale of dairy products, and to preserve the public health," being supplementary to and in aid of chapter two hundred and two of the laws of eighteen hundred and eighty-four, entitled "An act to prevent deception in sales of dairy products," as amended by chapter five hundred and seventy-seven of the laws of eighteen hundred and eighty-six, entitled "An act to amend chapter one hundred and eighty-three of the laws of eighteen hundred and eighty-five, entitled 'An act to prevent deception in the sale of dairy products and to preserve the public health,' being supplementary to and in aid of chapter two hundred and two of the laws of eighteen hundred and eighty-four, entitled 'An act to prevent deception in sales of dairy products.'"

§ 26. A search warrant, in the name of the people, directed to a peace officer commanding him to search for dairy products, imitations thereof and substitutes therefor, to open any place of business, factory, building, store, bakery, hotel, tavern, boarding-house, restaurant, saloon, lunch counter, place of public entertainment, carriage, car, boat, package, vessel, barrel, box, tub or can, containing, or believed to contain the same, in the possession or under the control of any person who shall refuse to allow the same to be inspected or samples taken therefrom by the said commissioner, assistant commissioner, or such experts, chemists, agents, or counsel as such commissioner or assistant commissioner shall duly authorize for the purpose, or to which access is refused or prevented, and to allow and enable the officer mentioned in section twelve applying therefor to take such samples of dairy products, imitations thereof and substitutes therefor, found in the execution of the warrant, as the officer applying for the search warrant shall designate when the same are found, shall be issued by any magistrate to whom application is made therefor, whenever it shall be made to appear to him that such person has refused to permit any dairy products, imitations thereof or substitutes therefor, to be inspected or samples taken therefrom, or that access thereto by any officer mentioned in section twelve has been refused or prevented, and that such officer has reasonable grounds for believing that such person has any dairy products, imitations thereof or substitutes therefor in his possession, or under his control, or that he is violating any of the provisions of this act. The provisions of section seven hundred and ninety-one to section eight hundred and two, both inclusive, of the Code of Criminal Procedure, shall apply to such warrant as far as applicable thereto. The peace officer to whom the warrant is delivered shall make a return in writing of his proceedings thereunto to the magistrate who issued the same.

(Amended by section 1 of chapter 140 of Laws of 1891.)

§ 27. No keeper or proprietor of any bakery, hotel, tavern, boarding-house, restaurant, saloon, lunch counter, or place of public entertainment, or any person having charge thereof or employed

thereat, shall keep, use or serve therein, either as food for their guests, boarders, patrons or customers, or for cooking purposes, any article made in violation of the provisions of section seven of this act, as amended by chapter five hundred and seventy-seven of the laws of eighteen hundred and eighty-six. This section shall not be so constructed as to require evidence of a willful or intentional violation thereof. Whoever violates the provisions of this section shall be guilty of a misdemeanor and punished by a fine of not less than fifty dollars, nor more than two hundred dollars, or not less than ten days' or more than thirty days' imprisonment for the first offense, and by imprisonment for one year for each subsequent offense.

§ 2. Section nineteen of such act, chapter one hundred and eighty-three of the laws of eighteen hundred and eighty-five, as amended by chapter five hundred and seventy-seven of the laws of eighteen hundred and eighty-six, is hereby amended so as to read as follows:

§ 19. If any person shall, by himself or another, violate any of the provisions of sections one, two, three, four or five of this act, or knowingly suffer a violation thereof by his agent, or in any building or room occupied by him, he shall in addition to the fines and punishments therein prescribed, for each offense forfeit and pay a fixed penalty of one hundred dollars. If any person, by himself or another, shall violate any of the provisions of sections six, seven, eight or twenty-seven of this act, he shall, in addition to the fines and penalties therein prescribed for each offense forfeit and pay a fixed penalty of five hundred dollars. Such penalty shall be recovered, with costs, in any court of this State having jurisdiction thereof, in an action to be prosecuted by the Dairy Commissioners or any of his assistants, or by any citizen authorized to sue in the name of the people of the State of New York. In any action heretofore or hereinafter commenced in the supreme court for the recovery of such penalties an application may be made on the part of the plaintiff to said court or any justice thereof, for an injunction to restrain the defendant, his agents, servants and employes, from the further violation of the sections or section on which such action is based during the pen-

dency thereof; and it shall be the duty of such court or justice to grant the injunction upon proof by affidavits that the defendant has been guilty of a violation of such sections or section as alleged in the complaint, or subsequent to the commencement of the action has been guilty of a violation thereof, and in the same manner as injunctions are usually granted under the rules and practice of such court. No security on the part of the plaintiff shall be required upon the granting of such injunction; and the court or justice shall make such order thereon as to the costs of the application as may be deemed just and proper. In case the plaintiff shall recover judgment for the penalties or penalty demanded in the complaint, the said judgment shall contain a permanent injunction restraining the defendant, his agents, servants and employes from any further violations of the sections or section on which the recovery is obtained. Any injunction secured under this section may be served by posting the same upon the outer door of the defendant's usual place of business, or where such violation was committed, or shall thereafter be committed, or in the manner required by the Code of Civil Procedure and the rules and practice of the court. It shall not be necessary to prove the personal service of the injunction where such service cannot be secured with reasonable diligence, but the service hereinbefore provided shall be deemed and held sufficient in any proceeding for the violation of such injunction.

§ 3. Section twenty-two of such act chapter one hundred and eighty-three of the laws of eighteen hundred and eighty-five, as added thereto by chapter five hundred and seventy-seven of the laws of eighteen hundred and eighty-six, is hereby amended so as to read as follows:

§ 22. For the purposes of said act, chapter one hundred and eighty-three of the laws of eighteen hundred and eighty-five, as amended by chapter four hundred and fifty-eight of the laws of eighteen hundred and eighty-five, and by chapter five hundred and seventy-seven of the laws of eighteen hundred and eighty-six, and as hereby amended, the terms "natural butter and cheese," "natural butter or cheese produced from pure unadulterated milk or cream of the same," "butter or cheese made from unadulterated

milk or cream," "butter or cheese, the product of the dairy," and "butter or cheese," shall be understood to mean the products* usually known by the terms "butter" and "cheese," and which are manufactured exclusively from milk or cream, or both, with or without salt or rennet, or both, and with or without coloring matter or sage or both.

§ 4. This act shall take effect immediately. Section three and section twenty-seven, hereby added to such act chapter one hundred and eighty-three of the laws of eighteen hundred and eighty-five, shall not apply to any product manufactured, or in process of manufacture, at the time of the passage of this act; but neither this exemption nor this act shall impair the power to prosecute any violations committed prior to the time of its taking effect of the sections hereby amended or of any laws existing at the time of its taking effect pursuant to and in the manner and under the rules and regulations provided by such sections and laws as they existed prior to the passage of this act.

Chapter 298.

An Act to promote agriculture and improve the quality of butter and cheese.

APPROVED by the Governor May 15, 1888. Passed, three-fifths being present.

The People of the State of New York, represented in Senate and Assembly, do enact as follows :

Section 1. The New York State Dairy Commissioner is authorized, empowered and directed to appoint and employ expert butter and cheese makers, not exceeding five in number, whose duty it shall be, under his directions, to examine and inspect butter and cheese factories and the methods employed therein, and attend at such agricultural fairs, institutes, meetings and conventions, within the State, as shall be designated by the Commissioner, to impart thereat information as to the best and most approved methods of making butter and cheese and improving the quality thereof. The compensation of such experts shall be fixed by the

*So in the original.

Commissioner and their necessary expenses incurred in the performance of their duty audited by him; and the same shall be paid by the Treasurer of the State upon the warrant of the Comptroller thereafter. The sum of five thousand dollars is hereby appropriated for such purpose, to be paid out of any moneys in the treasury not otherwise appropriated; and the entire expenses of the Commissioners under this act shall not exceed such sum. The Commissioner on or before the fifteenth day of December of this year shall report the number of experts employed under this act and their compensation and expenses, which shall be included in his annual report.

§ 2. This act shall take effect immediately.

Chapter 550.

An Act to amend chapter five hundred seventy-seven of the laws of eighteen hundred and eighty-six entitled "An act to amend chapter one hundred eighty-three of the laws of eighteen hundred eighty-five entitled "An Act to prevent deception in the sales of dairy products, and to preserve the public health," being supplementary to and in aid of chapter two hundred and two of the laws of eighteen hundred and eighty-four, entitled 'An act to prevent deception in the sale of dairy products' " as amended by chapter two hundred twenty-three of the laws of eighteen hundred eighty-seven.

APPROVED by the Governor June 9, 1888. Passed, three-fifths being present

The People of the State of New York, represented in Senate and Assembly, do enact as follows:

Section 1. Section one of chapter five hundred and seventy-seven of the laws of eighteen hundred and eighty-six, entitled "An act to amend chapter one hundred and eighty-three of the laws of eighteen hundred and eighty-five, entitled 'An act to prevent deception in the sale of dairy products, and to preserve the public health,' being supplementary to and in aid of chapter two hundred and two of the laws of eighteen hundred and eighty-four, entitled 'An act to prevent deception in the sales of dairy products,' " as

amended by chapter two hundred and twenty-three of the laws of eighteen hundred and eighty-seven, is hereby amended so as to read as follows:

§ 1. No person or persons shall sell or exchange, or expose for sale or exchange, any unclean, impure, unhealthy, adulterated or unwholesome milk, or shall offer for sale any article of food made from the same, or of cream from the same. The provisions of this section shall not apply to skimmed milk sold for use in the county in which it is produced, and the adjoining counties, except in New York and Kings counties (where it shall apply), provided it is sold for and as such. This provision shall not apply to pure skim cheese made from milk which is clean, pure, healthy, wholesome and unadulterated, except by skimming. Whoever violates the provisions of this section is guilty of a misdemeanor, and shall be punished by a fine of not less than twenty-five dollars nor more than two hundred dollars or by imprisonment of not less than one month or more than six months, or by both such fine and imprisonment for the first offense; and by a fine of not less than fifty dollars nor more than four hundred dollars or by imprisonment of not less than one month nor more than six months, or by both such fine and imprisonment for a second offense, and for a third or any subsequent offense by a fine of not less than two hundred dollars and imprisonment not less than thirty days and not exceeding three months.

§ 2. This act shall take effect immediately.

Chapter 515.

An Act to prevent deception in sales of vinegar, and charging the New York State Dairy Commissioner with its enforcement.

APPROVED by the Governor June 15, 1889. Passed, three-fifths being present.

The People of the State of New York, represented in Senate and Assembly, do enact as follows:

Section 1. No person shall manufacture, produce, sell, keep for sale or offer for sale any vinegar which shall not have an acidity equivalent to the presence of at least four and one-half per

centum, by weight, of absolute acetic acid, or any cider vinegar which shall have less than such amount of acidity, or less than two per centum, by weight, of cider vinegar solids upon full evaporation over boiling water.

§ 2. No person shall manufacture, produce, sell, keep for sale or offer for sale any vinegar or product in imitation or semblance of cider vinegar which is not cider vinegar.

§ 3. No person shall sell, keep for sale or offer for sale, as or for cider vinegar, any vinegar or product which is not cider vinegar.

§ 4. No person shall manufacture, produce, sell, keep for sale or offer for sale any vinegar which shall contain any preparation of lead, copper, sulphuric acid or other ingredients injurious to health, or any artificial coloring matter.

§ 5. Every manufacturer or producer of cider vinegar shall plainly brand on each head of the cask, barrel, keg or other package containing such vinegar, his name and place of business, and the words "cider vinegar;" and no person shall label or brand as or for cider vinegar any package containing vinegar which is not cider vinegar.

§ 6. Whoever, by himself or another, violates any of the provisions of any of the foregoing sections shall be guilty of a misdemeanor and, upon conviction, shall be punished by a fine of not less than fifty dollars nor more than one hundred dollars.

§ 7. If any person, by himself or another, shall violate any of the provisions of sections one, two, three, four or five of this act, he shall, in addition to the fines and penalties herein prescribed for each offense, forfeit and pay a fixed penalty of two hundred dollars for each offense. Such penalties shall be recovered with costs in any court of this State having jurisdiction thereof, in an action to be prosecuted by the New York State Dairy Commissioner or any of his assistants in the name of the people of the State of New York.

§ 8. The prosecution shall not be compelled to elect in any trial for the misdemeanors or suit for the penalties for the violation of sections one, two, three, four or five, where the indictment, information or complaint charges a violation of any two or more of such sections, between the charges or counts under such different sections.

§ 9. The New York State Dairy Commissioner is charged with the enforcement of the provisions of this act. The sum of five thousand dollars is hereby appropriated to be paid for such purpose out of any moneys in the treasury not otherwise appropriated, and the same shall be paid by the Treasurer of the State upon the warrant of the Comptroller upon the certificate of the State Dairy Commissioner. The entire expenses of said Commissioner in the enforcement of the provisions of this act shall not exceed the sum appropriated for the purposes aforesaid. Such Commissioner shall include in his annual report to the legislature a statement in detail of his work and proceedings, the number of assistant commissioners, chemists, experts, agents and counsel employed under the provisions of this act and their compensation, expenses and disbursements. The said commissioner and assistant commissioners, and such experts, chemists, agents and counsel as they shall duly authorize for the purpose, shall have full access, egress and ingress to all places of business, factories and buildings where vinegar is made, produced, sold or kept for sale. They shall also have power and authority to open any cask, barrel, keg or other package containing or believed to contain vinegar manufactured, produced, sold, kept for sale, or offered for sale, in violation of the provisions of this act, and may inspect the contents thereof and take therefrom samples for examination and analysis. When any officer authorized by this act to inspect vinegar offered for sale shall in the discharge of his duties take samples of vinegar it shall be his duty to take duplicate samples thereof, in the presence of at least one witness, and he shall, in the presence of such witness, seal both of said samples, and shall tender, and, if accepted, deliver, at the time of such taking, one sample to the vender of said vinegar, or to the person having custody of the same, with a statement, in writing, of the cause of the samples having been taken.

§ 10. For the purposes of this act, the term "cider vinegar" shall be understood to mean vinegar made exclusively of pure apple-juice. Sections one, two and four shall not apply to any vinegar or produce manufactured or in process of manufacture at

the time of the passage of this act, but the provision of law existing at the time of the passage of this act shall apply thereto.

§ 11. Chapter six hundred and six of the laws of one thousand eight hundred and eighty-six, and chapter six hundred and thirty-four of the laws of one thousand eight hundred and eighty-seven, are hereby repealed, but any violations thereof committed prior to the taking effect of this act may be prosecuted under the provisions of such law as they existed prior to the passage of this act.

§ 12. This act shall take effect immediately.

Chapter 140.

An Act further to amend chapter one hundred and eighty-three of the laws of eighteen hundred and eighty-five, entitled "An act to prevent deception in the sale of dairy products and to preserve the public health, being supplementary to and in aid of chapter two hundred and two of the laws of eighteen hundred and eighty-four, entitled 'An act to prevent deception in sales of dairy products.'"

APPROVED by the Governor April 7, 1891. Passed, three-fifths being present.

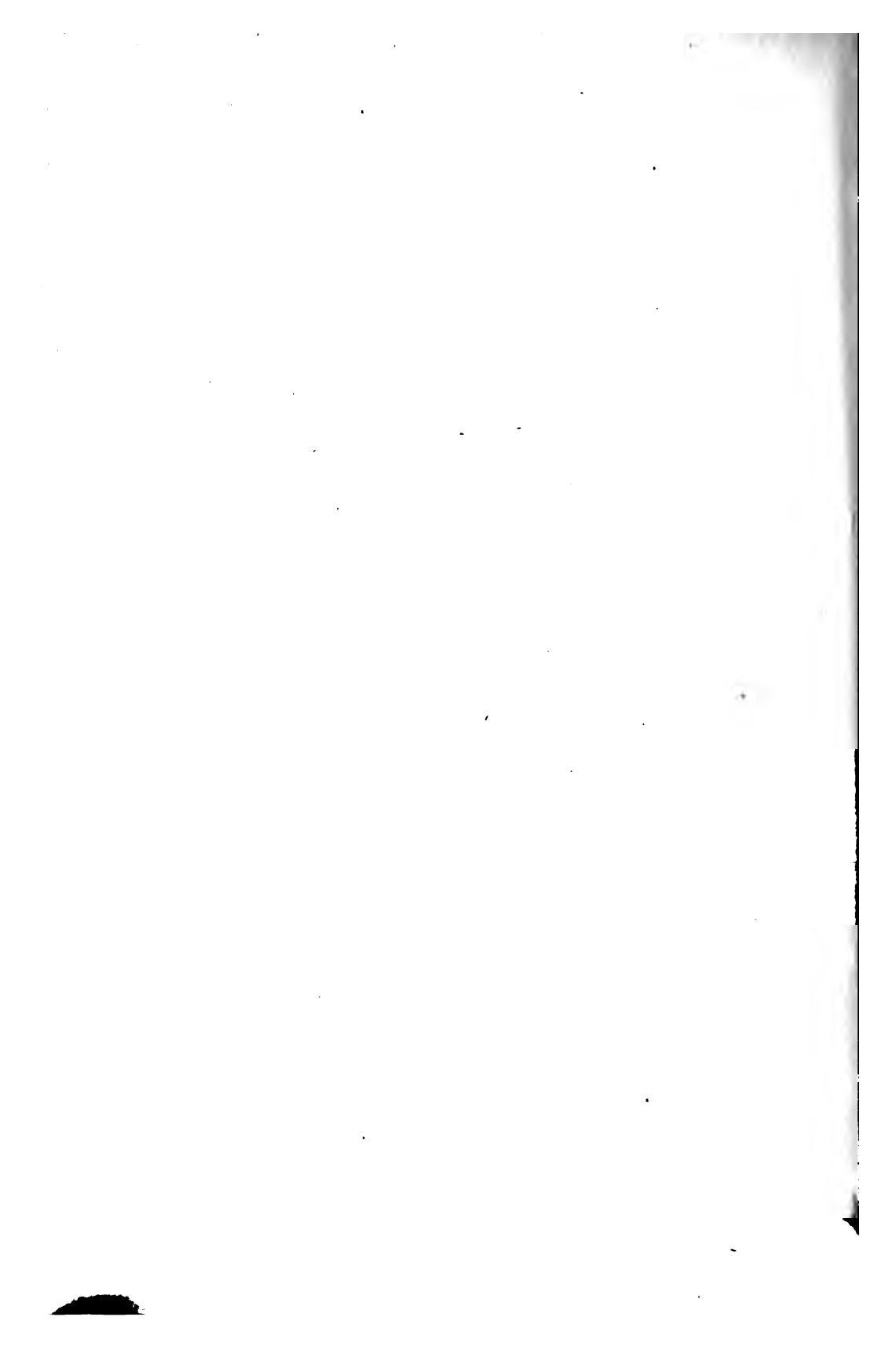
The People of the State of New York, represented in Senate and Assembly, do enact as follows:

Section 1. Section twenty-seven of chapter one hundred and eighty-three of the laws of eighteen hundred and eighty-five, as added thereto by section one of chapter five hundred and eighty-three of the laws of eighteen hundred and eighty seven, is hereby amended so as to read as follows:

§ 27. No keeper or proprietor of any bakery, hotel, tavern, boarding-house, restaurant, saloon, lunch counter, or place of public entertainment or of any place where any person or persons, in the employ of the keeper or proprietor thereof, is furnished with board, either without charge or as compensation wholly or in part for his services, or any person having charge thereof or employed thereat, shall keep, use or serve therein, either as food for their

guests, boarders, patrons or customers, or for cooking purposes, any article made in violation of the provisions of section seven of this act, as amended by chapter five hundred and seventy-seven of the laws of eighteen hundred and eighty-six. This section shall not be construed as to require evidence of a willful or intentional violation thereof. Whoever violates the provisions of this section shall be guilty of a misdemeanor and punished by a fine of not less than fifty dollars nor more than two hundred dollars, of not less than ten days' or more than thirty days' imprisonment for the first offense, and by imprisonment for one year for each subsequent offense.

§ 2. This act shall take effect immediately.



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